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"Academic Planning For Faculty Computer Science & Information Technology"

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ABSTRACT

This report will provide a brief description a **Smart Academic Planning (SMACAP)** for FCSIT is to help the Deputy Dean of Academic to organize the process management in an affectively manner. The scope for this system just for FCSIT because there are different management in education for each faculty;

This system provides four important modules such as;

i. User module (key in by)
   - Deputy Dean of Academic
   - Head of Each Department
   - Lecturers

ii. Course module

iii. Long Leave module

iv. Lecturer module

This web-based application is developed using ASP technologies on window XP with Personal Web Server. The database created will be stored in Microsoft Access, which is creating for maintenance purposes. The database will be managed by Smart Academic Planning System. The whole system makes use of the current web application development technology, namely Web-based three-tier client/ server architecture.

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CHAPTER 1 – INTRODUCTION

1.1 Project Definition

1.1.1 Overview and Purpose of Definition

My thesis was originally title **Sm**art **Aca**demic **P**lanning for FCSIT **(SMACAP)**. The name SMACAP (Smart Academic Planning) has been chosen to represent my thesis project for easier to reference.

This project is to help the Deputy Dean of Academic to organize the process management in an effectively manner. "**SMACAP**" intend to be a window-based application that enables a lecturer especially Deputy Dean of Academic to plan ahead all courses that going to be teach by the lecturer in faculty for the next semester and how to plan effectively long leave management process which staff might be on maternity leave, study leave and seminar that will approve after Deputy Dean of Academic and Dean of Faculty had been meeting and agree for their application and key in that information in without the usage of paper document but just using by calendar, schedule appointment taken to consideration, store information and so on.

Actually there are five responsibilities that should do by deputy Dean of Academic in faculty such as;

a) **To plan ahead all courses to each lecturer**

b) **Long Leave Management**

c) Meeting management

d) Academic Advisor Management

e) Timetable management

In this system, there are three important modules that containing in this system such as;

a) Lecturer module by

i. Deputy Dean of Academic

ii. Head of Department

iii. Lecturers

b) Courses module

c) Long Leave Module

However in this system, there are three modules not including like advisor academic management, timetable management and meeting management. The advisor module system has done by Senior Lim Thong Leong (Session 2001/2002, title "Academic Advisor Management") which includes all function that needed. The timetable modules system also have been done by Senior Oii Ling Sern (Session 2001/2002, title "Automated Scheduling System for FSCIT) and by Ong Soh Pun (Session 2001/2002, title "FSCIT Course Scheduling System") and the meeting management system have done by Senior Ong Suh Pun (session 2001/2002, title "Meeting management system for FCSIT). All of these systems to organize the process management in an effectively manner for this system, three modules above not including

Deputy Dean of Academic (DDA) and Head of Department (HD) only needs to access the system and click the course sub-module. In this module, there are five part courses for DDA and three part courses for HD. Actually, HD have assign the courses first to lecturer and pass that list to DDA for editing and assign another part such as university and faculty compulsory core courses that assign by DDA for next semester. Beside that, Lecturer has to key in their interested courses. When DDA and HD click the course all the information about that lecturer and courses will be out on the screen. This will help Deputy Dean of Academic to manage the management process affectively.

In my observation for two months, DDA has a big power and responsibility to arrange all the courses in this Faculty Computer Science and Information Technology FSCIT especially university courses and faculty compulsory core courses. All these courses have been taken by all students undergraduate in FSCIT, these courses will be offer in first and second semester for a first year students. Firstly, HD will divided each courses especially in elective courses, department Core courses, and faculty core courses to each lecturer and will pass up all courses name that have been assign to lecturer to DDA for checking, updating and will assign an university courses and faculty compulsory core courses.

For this year, FSCIT's student are 400 above a big size so that Deputy Dean of Academic must have an affectively system that help them to decided these courses for each lecturer based on their expertise and experience in the previous semester. According to this fact, all lecturer in faculty FSCIT must prepared themselves to teach that course either they have experience in that course or not.

In that case, the problem will be happen when that course assigned to the lecturer who not have experience or give to the new lecturer. They need to explored first before lecturer begin to give a good information and easy to understand for their student. Usually, some lecturer have decided to give the course base on their experience or interested in that course. It's better than give to the other lecturers who do not have experience.

To solve this problem, SMACAP system have a module that contain a names of lecturer that experience and interested to each course which I got that information from questioner about " the courses that you interested and experience" have done.

Beside that there are three main modules such as lecturer module (DDA, HD and lecturers), Long Leave module and course module and also four modules added to completely the system like announcement module, guestbook module and link module, change password module.

The manual organizer possesses many deficiencies that need to be improving. DDA need a more affective and organized way of recording their daily activities, lecturer profile, planning and etc. This project has explored all the technology available and the best technology is found to produce a system that is sufficient to help DDA to keep track the lecturer planning.

The requirement for the system in this project is collecting using questionnaire and through the existing system. Prototyping is used as the development methodology for the project. This system is known as Smart Academic Planning for FSCIT (SMACAP).

1.2 Problem Definition

For divided the course to each lecturers is very difficult because they have to manage it with the status's lecturer. As we know there are two categories of lecturers such as;

a) The lecturer who has post in faculty
    i. For example Dean, Deputy Dean of Academic, Deputy Dean of Development, Head of each department and so on
b) The lecturer who taught the courses without have any responsibility
    i. Lecturer under department.

In these cases, Deputy Dean of Academic has to know how to manage the courses affectively based on their heavy workload. Discussing of heavy workload, Human Resource has been prepare the formula that can be use for all faculty in University of Malaya so that they just key in the information base on that formula. The formulae of heavy workload education of academic staff in University Malaya will be discussed below;

Below shown that an average of heavy workload education to each lecturer;

a) Minimum credit hour lecturer = 6 hours a week
b) Maximum credit hour lecturer = 10 hours a week

This information will guide them to handle this problem. Although Human Resource also gave a specific calculation such as;

a) Thesis's checker

i. Has record in heavy workload calculation and the formula as follow

- Credit hour x 14 weeks x total of student x 1 %

b) Supervisor for one student

i. This is for lecturer who has a student under their supervision

ii. This categories for undergraduate student which will take a project paper or knowledge training (latihan Ilmiah)

iii. The formula as follow;

a. More then 10 of student

- Credit hour x 14 weeks x total of student x 1 %

b. Less then 10 of student

- Credit hour x 14 weeks x total of student x 25 %

c) The new lecturer

i. This category for the new lecturer that has constituted.

ii. Minimum of an average heavy workload for first year constituted have approval to reduced a credit hour 8 hours a week

iii. But in that period, they have to produce at least 1 publication and 1 research.

iv. Disallow to make a field work whether in this university or outside.

d) Staff academic

i. This category for an administrator such Dean, Deputy Dean and Head of Department

ii. Their heavy workload decided by Deputy Dean of Academic

iii. There are three category in this part as shown below;

- Dean = 3 credit hour for 2 semester
- Deputy Dean = 3 credit hour for 1 semester
- Head of department = 3 credit hour for 1 semester

e) Lecturer for other faculty

i. This category just for lecturer who taught the course at the other faculty.

ii. Credit hour limited to 6 hours a week.

f) Staff academic in special package program

i. This category for a staff academic who takes a lecturer in special package program which have been paid for example long Distance Education Program (PJJ) and the program under education center of university Malaya (PPBUM) and also the program which organize by othe4r faculty

ii. This lecturer had been decided by Dean.

For the faculty of medication in University Malaya have a different formula. It's cause of a different teaching imparted system base on the year and not semester

like the other faculty. The formula heavy workload calculation of faculty medic as shown below;

a) Faculty of medication

i. Teaching imparted system base on a year and not a semester.

ii. The minimum of an average heavy workload lecture a week for program under faculty of medic is fix to 7 hours a week.

iii. The formula of heavy workload;

$$\frac{\text{Total of lecturer hours for each learning phase}}{\text{38 a week}}$$

b) Faculty of Architecture

i. For a supervisor of studio in Architecture Department and Building's Measure Department in faculty of Architecture had changed as follow;

Architecture Department	=	4:3
Building's measure Department	=	3:2

Below are conclusions of all heavy workload lecturers for staff academic in University Malaya;

a) The minimum average of heavy workload lecture are 10 hours a week

b) There are many aspect that must be taken in a calculation of heavy workload lecture with weight as shown below;

- Lecturer [Weight on ratio 1:2]
- Tutorial [Weight on ratio 1:1]
- Clinical [Weight on ratio 1:1]
- Practical/lab [Weight on ratio 2:1]
- Studio's supervisor [Weight on ratio 3:2]
- Industry training/ Teaching training [Weight on ratio 1:1]
- Supervision per student include
    a) Knowledge training
    b) Project paper

These categories will calculation with the formula as shown below;

i. Greater than 10 students
    - (Credit hour x 14 weeks) x 50 %

ii. Least than 10 students
    - (Credit hour x 14 weeks) x 25 %

c) The calculation of heavy workload's lecture of staff academic for a week as shown;

$$\text{Total of lecturer hour} = \frac{\text{Semester I + Semester II + Special's Semester}}{\text{28 weeks}}$$

Beside this problem, there are five problems which are;

a) Time of management

- Time is one of the major stress factors have to deal with deadlines and other time constraints on a daily basis
- More often then not, there is too much to do and not enough time to do it. The emphasis of the importance of time is big.
- I spent 6 weeks to find the main module for my system, it's very hard to think because all the modules must to relate to what the system do.
- In this part, I waste my time probably that I'm still new to develop the system and not have much experience.
- There are three modules that not including in this system cause it's have to develop in specific way and it's involve a big size of student in FCSIT.
- Cancelled of an appointment to lecturer and Deputy Dean of Academic cause of clash with my class and also they are busy that waste the time.

b) Understanding the system

- Take along time to understand the system because this is the first system that I will develop.
- Problem to understand each chapter which need for this system especially requirement from the user (Deputy Dean of

Academic and lecturer), function requirement and interface design.

c) Problem with questioners

- Late to make a questioner cause of waste a time.
- This problem happen because not understand in detail about what the system for and what its functionality.

d) Problem with Deputy Dean of Academic

- Cancelled of an appointment to lecturer and Deputy Dean of Academic cause of clash with my class.
- Not give a full commitment because they are very busy.
- The previous Deputy Dean of Academic Dr. Syed Malik Fakar Duani bin Syed Mustapha has been leaving for his sabbatical. It's difficult to find the information from he which that information can help me to compare what his techniques was used with today.

e) Problem with lecturer

- Some lecturer not pass up the questioner or late to pass up.
- Some lecturer were leaving so that difficult to make a conclusion for overall.

1.3 PROJECT MOTIVATION AND SIGNIFICANCE

1.3.1 Motivation of project

This project is relevant because Deputy Dean of Academic need effective approach to help to organize all activities in faculty such as to plan ahead all courses that going to be teach by the lecturer in faculty for the next semester, and how to plan affectively long leave management process and so on.

Deputy Dean of Academic find out difficult in managing their workloads and arrange their file in order. They find out the time consuming when they need certain files or information to refer. With this system, Administrator (Deputy Dean of Academic) and user (Lecturer) can find out the information they want straight away from the database and this can save a lot of time.

Beside that, all lecturers face with a problem to teach the course that them not interesting or experience. But with this system the problem can be solve where lecturer have to tick in the form that include all courses which the course that their interested and experience. All these data will stored in database and when administrator want to divided the course for next semester they just key in the ID course and the data that had been stored will come out on the screen which related to course. This way can save a lot of time.

1.3.2 Significance of project

Much benefit would be given in term of;

a) Higher quality and faster time of revision

- Reducing the time spent looking for information and document and ensuring the document drawn for the latest information are always available and shorten overall review and revision process.

b) Enhancing speed of processing

- To aim to be more productive in a short period of time and at the lower cost while improving quality eliminating non-value-added step, enabling quicker decision making processes, increasing velocity of transaction, dissolving organizational boundaries and connecting information promptly and accurately.

c) Centralized management of corporate resource holding.

- By centralizing the management and administration for share resources, any information needed can be found easily and the integrity of information would always be present.
- Additionally centralization of management information sharing, time needed for retrieving information would be sharply reduced.

1.4 PROJECT OBJECTIVE

The main objective of this thesis project is to development a web-based that can help Deputy Dean of Academic to planning any event which related to Deputy Dean of Academic's job in faculty.

1.4.1 The objective of "SMACAP" system

a) Provide five important modules such as;

- Administrator maintenance module, user maintenance module, course maintenance module, Long leave management maintenance module, meeting management module and lecturer maintenance module.
- Administrator and lecturers is the user who uses this system to plan their activities.
- The administrator in this system is a Deputy Dean of Academic who manages all activities which related to lecturer.
- Lecturer can not access to the administrator's module because administrator have a power to manage (add, edit, update, delete, print and set reminder) all the lecturer's activities like maternity leave, study leave seminar, appointment etc.

b) Provide four added modules to completely this system such as;

- Reminder module, contact module, calendar module and login module.
- Reminder module use to keep track of their reminder list and related reminder information to remind them on the important event.
- Login password just for academic staff such as Deputy Dean of Academic and lecturer.
- Provide address book and email facility for the lecturer to manage his/her contact.
- Provide a changing password module.
- Provide a user friendly and intelligent (conservation) web-based interfaced.
- Easy access anytime, anywhere as long as connected to the internet..

1.5 SCOPE OF PROJECT

1.5.1 System scope

a) Just for faculty Computer Science and Information Technology, UM.

- This system was developing just for FCSIT because of difference of administrator each faculty.
- Based on the objective to developing this system, it focus to help Deputy Dean of Academic to plan ahead all the courses that going to be teach by the lecturer in the next semester, how to manage a leaving's activities, how to inform the meeting will hold to all lecturer in affective way.
- Compare to other faculty such as faculty of Sastera, The Deputy Dean of Academic is not involved to management process like FCSIT's Deputy Dean of Academic. They just have to observe.
- That why this system just for FCSIT.

b) User (lecturer)

- More than one lecturer could teach the same course.
- No lecturer Scheduled to two different courses at the same time.
- Lecturer can not access the system within authenticate of user ID and password.
- Lecturer can not access the administrator's module.

c) Deputy Dean of Academic

- Administrator allows authorized user to access the system.
- Administrator can achieve all information above but lecturer can not access the administrator's information.

d) Course

- The system just for to help Deputy Dean of Academic to divided each course undergraduate to the lecturer.
- One course may teach by more than one lecturer.
- Timetable not including for this system.

e) Long leave

- For leave management not including the short leaving such as seminar's leave.
- This long leave including maternity leave, study leave and sabbatical leave which take a more time.
- This application will be approving by Dean and Deputy Dean of Academic after they had meeting manually.

In this system there are three modules that not including such as;

a) Timetable

- Time table or scheduling of courses is a big part that involved a room, a time to lecture and divided all course s that had offered to each lecturer's base on the total of student which had registered in FCSIT.

- To divided that course we need showing much effort to avoid any clash either to the other courses, time or room that be used.
- In this case, to develop a SMACAP system just have 3 months for first phase is not enough to including timetable module, because its involve a big size information of student, lecturer and the courses which that have to keep database.
- To solve this problem, the title of "Timetable Scheduling Automated System" had been produced by other supervisor for the other student who taken WXES 3181.
- After both of these systems are completely done, this system will be combining to be a system that can be used by Deputy Dean of Academic in affectively manner.

b) Advisor module

- This module not including cause of a big size of student that registered in FCSIT.
- In this case, information's detail of each students have to stored in database, it means that for this year there are 400 above student registered in FCSIT so that we have to store all their information in database.
- According to that evidence, we decided to skip this module to other developer's system to develop this system affectively.

c) Meeting module

- This module not including because have done by senior completely.
- In this case, I decided to combine all system that relative for FCSIT.

1.6 Expectation Outcome

The following are the outcome that is expected from the completion of this web base **Smart ACAdemic Planning** (SMACAP) for FCSIT,

a) Lecturer section

i. Change their password

- Could change their password anytime for safety of their information.

ii. Key in data

- Key in data in this system such as login, personal information and their long leaving activities and so on.
- Lecturer can keep personal information such as address, phone number email etc.

iii. View the data

- Could view their subject which will teach for next semester.
- View the approval of their long leave application by DDA and HD.
- View some announcement which make by head of department or Deputy Dean of Academic.

- Allow lecturer view record of the course in FCSIT, the precondition of the course and much other information related to the courses such as credit hour and lecturer in charge the course.
- Lecturer could view message box

iv. Contact

- Lecturer can contact with their friend, relative and colleagues.
- They also can send message and email.

b) Administrator section

i. Administrator allows authorized user to access the system.

ii. Administrator can achieve all information above but lecturer can not access the administrator's information such as;

- How they divided the course to each lecturer?
- How they manage of leaving activities?
- How they process the leaving's lecturer to give an approval for that application?

iii. Development of database to keep all the system.

iv. To do some maintenance work to the change of the approval application from the lecturer.

v. To generation the report.

1.7 Project Scheduling

This project was planned under the schedule activities and it management to reach the project goal. Since a project may involve extensive effort, its must be

properly managed. Project management is the coordination of all aspects of a project so that it can be completed under constrains defined. Planning is done to achieve the following objective;

a) Define the goal

b) Define and allocate the resource

c) Establish timetable, schedule work

d) Track and monitor project.

e) Report and document project

In order to meet the project milestone and due date as well as to ensure systematic development of Academic Planning System, A schedule was planned in set of seven milestones as follow, refer to table 1.1

CHAPTER 2 - LITERATURE REVIEW

2.1 What is literature review?

Literature review is a critical look at existing research that is significant to the work that a research is carrying out. It summarizes, interprets and evaluates existing "literature or publish material" in order to establish current knowledge of a subject. The purpose for closing so relates to ongoing research to develop that knowledge, the literature review my solve a controversy, establish the need for additional research and / or define a topic of inquiry.

In this project paper's context, literature review is an analysis that used to gather information about the system that intends to develop. The approach is used to evaluate existing system on the same topic so that the better product can be developed. It also includes the comparison of a few software, tools and approach to get the best outcome. Without this analysis, It's would not be able to identify the strengths and weakness for the system that going to develop.

Some issues in planning carries with its own set of the general planning requirements. Very often, the problem are so different that they may hardly be classified as of the same form and more often an efficient solution methodology for one will prove inefficient for another. Some examples of planning or organizing are school planning, job shopping planning, university courses planning, and university examination planning and so on. Each types of planning have it own general aims, specific constraints and resources. These must be elicited before a planner may start

the process of constructing a plan. Similarly host of other issues must also be addressed. Some examples of the sort of schedule a plan must ask;

- What is the purpose of the planning?
- What constraint must be planning satisfy?
- What qualities are desirable in the planning?
- Does a feasible plan exist?
- Who will be affected by planning?
- What sources are available?
- How much time is available to produce this planning?

2.2 EXISTING SYSTEM.

2.2.1 Reservation meeting's room of FCSIT

First category is a meeting room and charge by an administrator staff. The second category is all the rooms for teaching and learning purpose (lecturer hall, tutorial room and lab) is managed by timetable committee. But in this part we elaborate the meeting's room reservation which related to the system.

There are three meeting rooms in the faculty at present and is managed by administrator staff. Reservation of meeting rooms is based on the meeting priority and it is not FCSIT method. Below steps reservation room for existing manual in FCSIT;

a) User gets application form from the office during office hour.

b) User submits the form to the attendant.

c) The attendant will compare the reservation timer the record in book.

- If meeting room available, request is accepted.
- If there is any clash of time, it will depend on the priority of the meeting.

d) Reservations are not allowed after working hour except upon special request.

2.2.1.1 Weakness of system

a) Not convenient

- As the user have to fill in the form to reserve the room, it is not convenient since they can only request for a room during office hour. Also user my feel difficulty if the attendant is not found.

b) Increase workload

- Since the reservation process is done manually by the attendant it will undeniably increase their workload. It is suitable to have a system that can assist the attendant.

c) Not systematic

- The manual system is not organized and thus is not systematic.
- Also there is no database to keep all the reservation's records.
- Administrator will face the problem to keep track the reservation and will also face problem if they want to search a particular record.

d) Not informative

- There is no way the user can know the capacity and latest facility provided unless they refer to the technical staff in charge.
- In this case, they have no referred to different people to complete a single task.

2.2.2 Department of Biological Chemistry and Molecular Pharmacology, Medical school, Havard University

It is a web-based application that provides inline booking system for their conference room. When user click on the URL above, they will be directed to a page where it show all rooms open for booking and the facilities provided are listed in a table. The name of the room is linked to another page which shows it an availability for the present month.

User can choose the date that they desire to see the availability of their room. To make a reservation, user need to click on the add event link at the bottom of the page. User can choose whether they want to add daily event, duration event, periodic event or time slot event.

2.2.2.1 Strength of the system

a) The availability is shown very clearly by using a calendar. Moreover, the calendar can be displayed in year, month and week and day format.

b) The system allows daily, duration, periodic and timeslot section.

c) The system show the purpose of booking as well as the person who booking the rooms.

d) An email reminder is available.

2.2.2.2 Weakness of the system

a) Complicated to use.

b) Picture of rooms are not included.

c) The user needs to remember the name of the rooms.

d) No online cancellation or modification provided after the reservation has been made. Users have to contact the administrator to cancel the reservation.

2.2.3 Lotus Leave (leave management)

Below are examples of familiar leave management system that is available in the internet and comparing with the current Leave management in FCSIT. Lotus leave is a Lotus notes/Domino server based application designed to automate the leave processing system in an organization.

The application use the inherent email environment provided by lotus and is the leave processing system in need of any office that plan to be paperless in the future. An organization can define its leaves policies using this application and a total approval cycle can be provided for its employees. With this system at the helm of affair;

a) The organization need not to go print their leave application from to any paper printer company.

b) The cost of paper and print charges is out of question in this case.

c) The employee need not wait outside the office of their approver to wait for their leave application to approve.

d) No body can fiddle with the pending leaves of the employees.

e) The approver can at anytime look for the employees who are on the leave.

2.2.3.1 Feature of this application includes;

a) The application contains a full approver cycle.

b) The HR department decided the approval cycle for the employees.

c) The employees who do not have to wait for approval of their application can take care of such evaluation and can be customized accordingly.

2.2.4 Current Leave Management System in FCSIT.

There were three similar project regarding Leave Management system attempt by student of FCSIT. This analysis is carried out to understand the strength and weakness of each project and this are suitable approach and design can be determine.

This systems conducted by Cham Yim Kim as final year thesis, session 2000/20001. This system allows the staff academic to fill the form of leave activity online. The system divided to two sub-modules such as; to administrator and to user.

2.2.4.1 Strength of system

a) The availability is shown very clearly by using a calendar. Moreover, the calendar can be displayed in year, month, week and day format.

b) The approver (Administrator) can anytime look for the lecturer who is on the leave.

c) The applicant can at anytime look for their past leave.

d) The cost of paper and print charges is out of question in this case.

2.2.4.2 Weakness of the system.

a) There is no reminder available which is important to remind.

b) There are no sufficiency guidelines and instruction to assist the user.

c) There is no auto email leave capability to confirm the leaving.

2.3Intelligent Interface Definition

Citing the paper presented by Anike waern, the area of intelligent interface is one of the most heterogeneous research subjects dealing with computer that exist. Most researches would agree that the system can maintain the human dialogue would be considered intelligent. The problem is that there are a lot of interface that could be considered as intelligent that do not look "human" in any sense at all. An example is that PUSH interface, which present hypertext in a manner is adapted to the users' current task. This passive form of user adaptation does not in any way mimic human behavior, but is constructed to be the natural extension of the hypertext view of information.

According to anike Wearn an intelligent interface should employ some kind of intelligent technique. What exactly counts as an intelligent technique will== over time but the following list a fairly complete list of the kind of technique of today are being employed in intelligent interface;

a) User adaptively

- Technique that allows the user system interaction to be adopted to different user and different usage situation.

b) User modeling

- Technique that allows a system to maintain knowledge about a user.

c) Natural Languages Technique

- Technique that allows a system to interpret or Generate Natural Language utterances in text or speech.

d) Dialogue Modeling

- Technique that a allows a system to maintain A Natural Language with the user, possible in other interaction means multi modal dialogue.

e) Explanation Generation

- Technique that allows a system to explain its result to a user.

Annika Waern also states that one way to understand the intelligent IS to compare it to the research goals outlined by Russel and Wefald in their definition of Intelligent Agents.

Firstly, Russel and Wefald degree an ideal rational agent does not exist-event if we could define an algorithm for always computing the ideal response, If would take infinite computational power to produce the ideal response before it become obsolete. So Russel and Welfred defined an intelligent agent as an agent that has some limitation in its reasoning power but that always does the right thing within this limitation. The limitation of agent are essentially given by its architecture, so that contain result take very long time to produce and may for this reason become sub optimal in a changing world.

Following Russel and Wilfred, we could defined intelligent interface the same way an ideal interface is simply an interface that always gives the absolutely optimal response and an intelligent interface is one that has limited capabilities but give the restricted to the internal architecture of the system but lie foremost in its abilities interact.

2.4REVIEWS ON THE INTERNET AND WORLD WIDE WEB WWW

2.4.1 Internet

The world indeed 'shrunk' with the introduction information technology Sophisticated Telecommunication devices such as telephone, fax, machine, modems, multiplexes and router had been developed to facilitate the instant exchange of information is through the services of internet.

2.4.2 What is internet?

The internet is a network of networks. It currently connects thousand of networks to allow user to globally share information and computer resources. With the internet, user can share anything that can be stored in a file.

Internet communication is possible between network on different platform and different environments. This dynamic exchange of data is in part due to the development of communication protocols. Here are two different LAN topologies. This Internet has a connection to the internet and share some of its functionality.

Today, the protocols and other technologies, such as the World Wide Web, have contributed to this growth.

2.4.3 The advent of World Wide Web

The World Wide Web (WWW) is one of the newest and friendliest Internet services, researches no longer had to perform the many step necessary to gain access to the different available internet services.

The World Wide Web (WWW) is a large a rapidly expending collection of electronic documents that can combine text, images, sound and video. User can set up home pages to advertise their products and services to the whole world. Any remote user an the web can access and display that information.

Different web component have been design and develop to work together to help easily publish and gain access to information.

2.5 REVIEW ON DATABASE

2.5.1 What is Microsoft access?

The database is used in project are Microsoft Access. Microsoft Access is a database management system for windows. It provided standard data management feature for data storage retrieval but uses graphical tool made possible by the windows environment to make task easier to perform.

2.5.2 Why Microsoft access?

Like other database management system Microsoft Access provided a way to store and manages information. Microsoft refers to access as a relational database product since access allows relating data from different sources.

Access considers both the table of data that store the information and the supplemental object that present information and work with it to be part of the database. This differs from standard database system terminology in which only the data itself is considered part of the database.

Access store data in tables that are organized by rows and columns. A database can contain one table or many other objects such as report program modules and considered to be part of the database along with the tables.

2.6 REVIEW ON PROGRAMMING LANGUAGES AND TECHNOLOGY.

2.6.1 What is ASP?

- ASP stands for **A**ctive **S**erver **P**ages
- ASP is a program that runs inside **IIS**
- IIS stands for **I**nternet **I**nformation **S**ervices
- IIS comes as a free component with **Windows 2000**
- IIS is also a part of the **Windows NT 4.0 Option Pack**
- The Option Pack can be **downloaded** from Microsoft
- **PWS** is a smaller - but fully functional - version of IIS

- PWS can be found on your **Windows 95/98 CD**

2.6.2 ASP Compatibility

- ASP is a Microsoft Technology
- To run IIS you must have Windows NT 4.0 or later
- To run PWS you must have Windows 95 or later
- ChiliASP is a technology that runs ASP without Windows OS
- InstantASP is another technology that runs ASP without Windows

2.6.3 What is an ASP File?

- An ASP file is just the same as an HTML file
- An ASP file can contain text, HTML, XML, and scripts
- Scripts in an ASP file are executed on the server
- An ASP file has the file extension ".asp"

2.6.4 How Does ASP Differ from HTML?

- When a browser requests an HTML file, the server returns the file
- When a browser requests an ASP file, IIS passes the request to the ASP engine.
- The ASP engine reads the ASP file, line by line, and executes the scripts in the file. Finally, the ASP file is returned to the browser as plain HTML

2.6.5 What can ASP do for you?

- Dynamically edit, change or add any content of a Web page
- Respond to user queries or data submitted from HTML forms
- Access any data or databases and return the results to a browser
- Customize a Web page to make it more useful for individual users
- The advantages of using ASP instead of CGI and Perl, are those of simplicity and speed
- Provides security since your ASP code can not be viewed from the browser
- Since ASP files are returned as plain HTML, they can be viewed in any browser
- Clever ASP programming can minimize the network traffic

2.6.6 How to install IIS and run ASP on Windows XP Professional

Note: You cannot run ASP on Windows XP Home Edition.

- Insert the Windows XP Professional CD-Rom into your CD-Rom Drive
- From your **Start Button**, go to **Settings**, and **Control Panel**
- In the Control Panel window select **Add/Remove Programs**
- In the Add/Remove window select **Add/Remove Windows Components**
- In the Wizard window check **Internet Information Services, click OK**
- An **Inetpub folder** will be created on your harddrive

- Open the Inetpub folder, and find a folder named **wwwroot**
- **Create a new folder**, like "MyWeb", under wwwroot.
- **Use a text editor** to write some ASP code, save the file as "test1.asp" in the "MyWeb" folder
- Make sure your Web server is running - The installation program has added a new icon on your task-bar (this is the IIS symbol). Click on the icon and press the Start button in the window that appears.
- **Open your browser** and type in "http://localhost/MyWeb/test1.asp", to view your first ASP page

2.6.7 Differences between VBScript and JavaScript

When calling a VBScript or a JavaScript procedure from an ASP file written in VBScript, you can use the "call" keyword followed by the procedure name. If a procedure requires parameters, the parameter list must be enclosed in parentheses when using the "call" keyword. If you omit the "call" keyword, the parameter list must not be enclosed in parentheses. If the procedure has no parameters, the parentheses are optional.

When calling a JavaScript or a VBScript procedure from an ASP file written in JavaScript, always use parentheses after the procedure name.

2.6.8 HTML vs. ASP

Firstly, while ASP is different from HTML, it is usually written as scripts within an HTML document. HTML is a static document that the Web server

displays upon request by the browser. But if the HTML has ASP scripts embedded within it, the server will run those scripts and then display the results within the page on the browser.

2.6.9 ASP vs. JavaScript

So, it sounds like ASP is more like JavaScript than HTML. However, JavaScript is run in the Web browser itself rather than on the server side. This gives you all the processing power of the Web server to back up your scripts. Plus, because it is run separately from the browser, it can interact with other server-side technology such as databases, unlike JavaScript.

CHAPTER 3 – METHODOLOGY

3.1 Available Methodology

There are many methodologies available that can be used in a software development project. Some of the criteria to be considered when choosing a suitable methodology are;

- A person team wills mange the project, this mean that any advantages a methodology has for team management and communication are largely irrelevant for this project.
- The project has a reasonable short timeframe to completion, this means that the flexible approach would be an advantages.
- Other criteria are that the methodology fit in well with the language and development environment that I am using.

3.1.1 Waterfall methodology

The waterfall is an engineering model designed in 1790 to be applied to the development of software. The idea is the following; there are different stages to the development and the outputs of the first stage "flow" into the third stage and so on. The methodology offered a means of making the development process more structured.

In an original Waterfall (see figure 3.1) a structure sequentially was at least implied. This meant that one phase had to be completed before the next phase

was begun. It also neither did nor provide for feedback between phases or for updating / redefinition of earlier phases. This implies that there are definition breaks between phases, e.g. that each phase has a structure, non-overlapping start and finish and is carried out sequentially. Critical point of this model is that no phase is complete until the documentation or other product associated with the phase is completed.

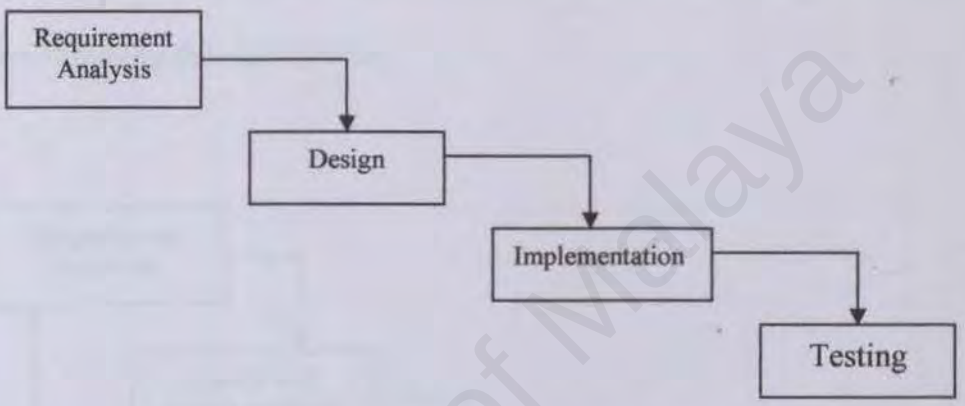

Figure 3.1; the original Waterfall Methodology

3.1.2 Methodology Modified Waterfall

In the waterfall methodology considerable emphasis must be placed on determining user's need and requirement prior to system being built. The identification of user's requirement as early as possible and the agreement between user and developer with respect to these requirements often is the deciding factor in the success or failure of a project. These requirements are documented in the requirement specification, which is used to verify weather subsequent phase are complying with the requirements.

To overcome the rigid waterfall methodology, a modified model was introduced. This modified model is needed to provide for overlap and feedback between phases. Rather then being a simple linear model. It needs to be an interactive model. To facilitate to completion of the goals, milestone and task, it is normal to freeze part of the development after a certain point the iteration. In this, model verification and validation are added. Verification check that the system is correct (building the system right) while validation check that the system meets the user's desires (building the right system).

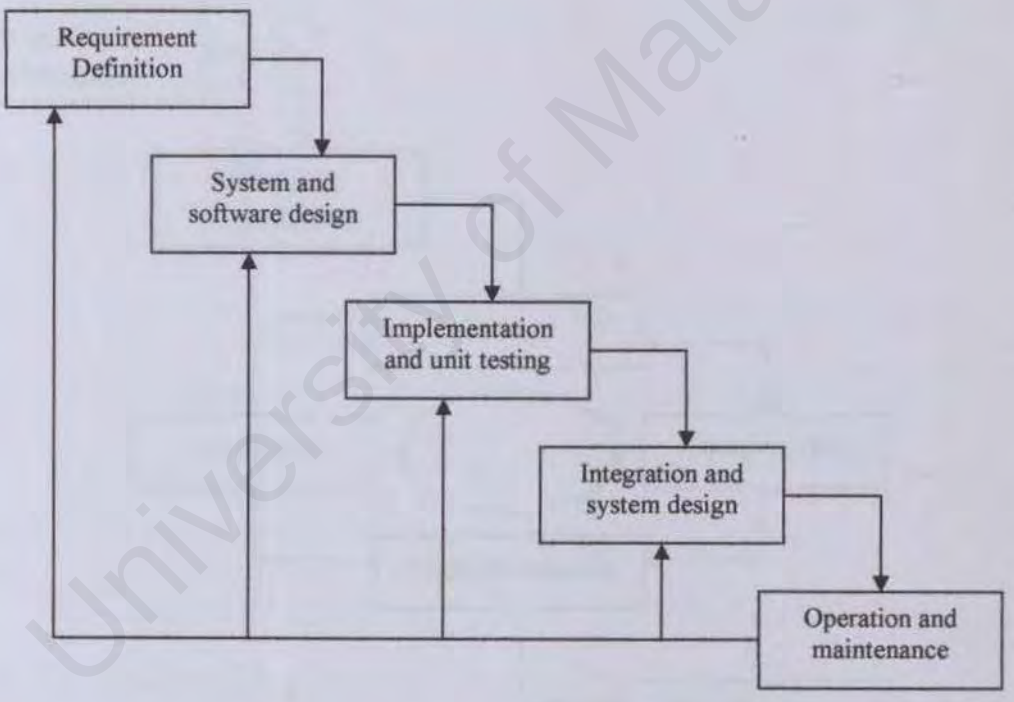

Figure 3.2; show the diagram of the modification Waterfall Methodology

3.1.3 Rapid application Development (RAD) Methodology

Another available is the Rapid Application Development (RAD) Methodology (see figure 3.3). RAD Techniques emphasize user involvement in the Rapid and evolutionary construction of working prototypes of a system to accelerate the system development process. It is seen by many as the alternative to the modified waterfall methodology. Its tries to overcome the start coming of the waterfall's inflexible approach by involving the users of the end product during stage of development

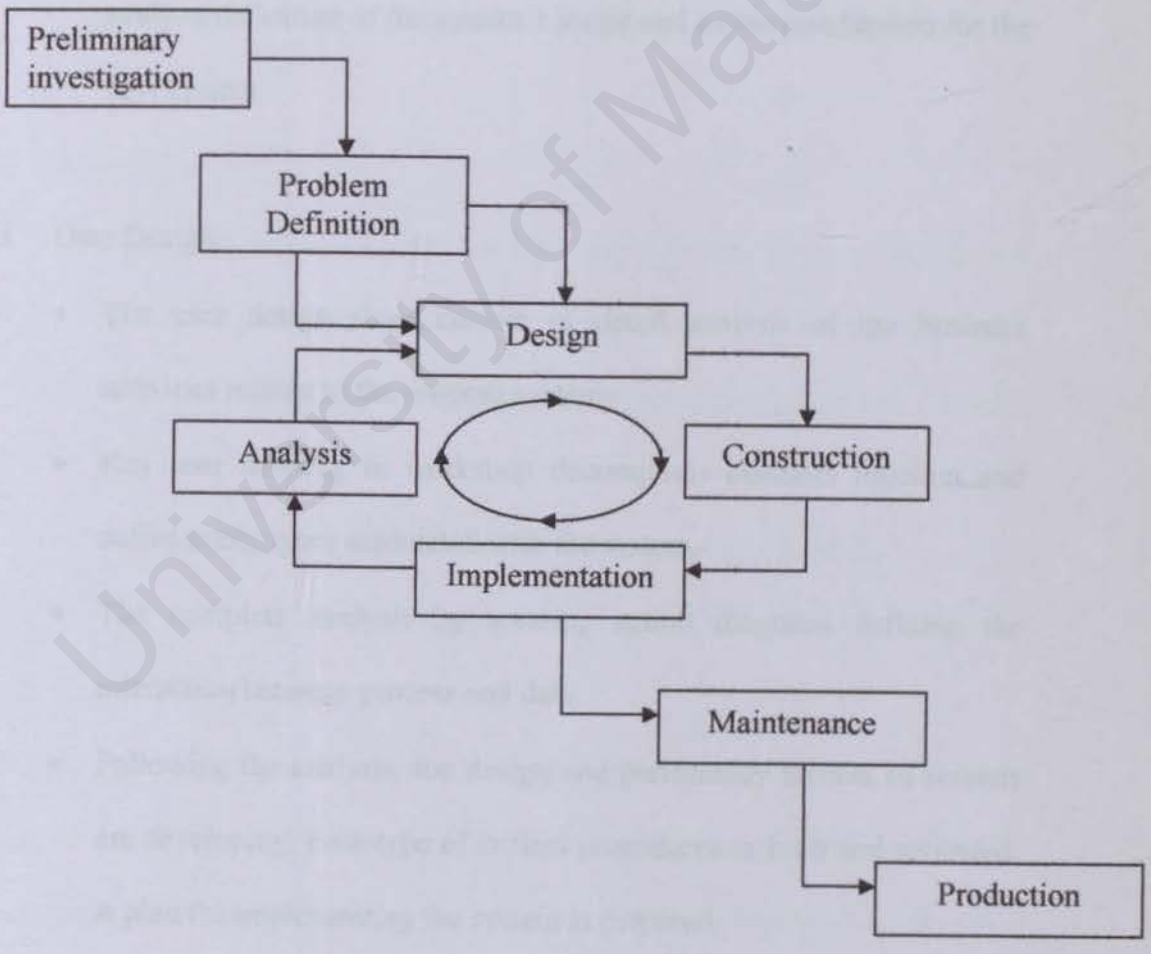

Figure 3.3; Rapid Application Development (RAD) Methodology

There are four main stages in RAD;

i. Requirement planning

- The requirement planning stages consist of review of the areas immediately associated with the propose system.
- These reviews produce abroad definition of the system requirement in term of the functions the system will be support.
- The deliverables from the requirement planning stages include on outline system area model (entity and process model) of the area under study, a definition of the system's scope and a coat justification for the new system.

ii. User Design

- The user design stage consist of detail analysis of the business activities related to the propose system.
- Key user meeting in workshop decomposes business function and define entity types associated with the system.
- The complete analysis by creating action diagrams defining the interaction between process and data.
- Following the analysis, the design and preliminary layouts of screens are developing. Prototype of critical procedures or built and reviewed. A plan for implementing the system is prepared.

iii. Construction

- In the construction stages, a small team of developer, working directly with user, finalizes the design and builds the system.
- The software construction process consist of a series of "design and build" step in which the user have opportunity to fine time the requirements and review the resulting software implementation.
- These stages also include preparing for the cutover to production.
- In addition the test software, construction stages deliverables include documentation instruction necessary to operate the new application and routine and procedures needed to put the system into operation.

iv. Implementation

- The implementation stages involve implementing the new system and managing the new one. This way includes implementing bridge between existing and the new system connecting data and training user.
- User acceptance is the end point of the implementation stage.

3.1.4 Chosen Methodology

After reviewing all the available, methodologies, I have decided to use the Modified Waterfall as my Methodologies. The original Waterfall Model was too rigid and provides no feedback between phase for updating or redefinition of earlier

phase. This is too inconvenient as a simple change will destroy the entire framework.

In my opinion RAD is slight too heavyweight to my thesis project as it need intensive involvement of user in the design and construction of the system. It will be quite difficult irrelevant and inefficient to meet frequently with lecturer or the supervisor for the design and structuring the system. I fell that the meeting and intensive involvement of user would be more suitable if the application develop was meant to be a commercial product but not quite suitable for our education thesis project.

Modify Waterfall meet the criteria of my thesis course, which is document driven and yet flexible enough to allow modification while progressing through each stage of development. Because of its structure and logical flow, the Modified Waterfall Model is more predictable and this allows better estimation e.g the project schedule an estimated outcome. Although it is one of menu traditional method, it is more reliable as a project plan or architecture has been laid out before the construction of the system. Subsequently, getting trapped in the prototyping circle of RAD would not happen here.

With this in mind, the development of SMACAP'S system with follow the phases as illustrated in figure 3.2

3.2 Methodologies for user elicitation

Information and data are useful for analyzing process, it provide us with the answer to the system requirements. Many techniques have been done to get useful data and information at the beginning of the project.

To define the system requirements, the following techniques are used;

i. Discussion with Supervisor
ii. Questioners
iii. Interview
iv. Document Room in FCSIT
v. Internet surfing

3.2.1 Discussion with supervisor

- Discussion with supervisor is the main sources where I get the idea.
- Supervisor gave valuable advice and consistent explanation on how to implement this system.
- I decided 3 times a week to meet my supervisor. To discuss what I have done for each chapter so that all information which will documented wouldn't out from the main objective.

3.2.2 Questioners

- This technique to collection some information by using a form or document that has been created to find some response from the respondent.

- This is very important to know what criteria and also the requirements that need by user.
- The respondent that involved in this technique is lecturer in Faculty Computer Science and Information Technology (FCSIT).
- All questions in these questioners shown that the courses which have taught by lecturer in previous semester and the courses that their interested either in neither their department nor other departments.

3.2.3 Interview

- Unstructured interviews have been carried out. In an unstructured interview question are not written in advance, enabling asking follow-up or clarifying questions immediately.
- There are key interviewee are;

i. Deputy Dean of Academic (FCSIT)

a) From faculty Computer Science and Information Technology

- Prof. Madya Dr. Siti Salwah Salim (session 2000 – 2002)
- Prof. Madya Dr. Sameem Abd Kareem(session 2002 – now)

ii. From faculty Sastera

- Prof. Madya Sidin Ishak

iii Head of Department

a) From faculty Computer Science and Information Technology

- Prof. Madya Dr, Ow Siew Hock (Software Engeneering)

b) From faculty Sastera

- Prof. Madya Dr. Abdullah Zakaria (Southeast Asia)

Iv Lecturer

a) Mrs. Fazidah Othman

b) Mrs. Nazean Jomhari

V Registration's assistant of FCSIT

a) Mrs. Khalidah Mushar

3.2.4 Document Room in FCSIT

- Several seniors thesis which is related with this survey have been studied in order to gain the skill for software development such as technology used by seniors, the structure of their thesis like client / server architecture, programming tools.
- I go to the document room 2 times a week after the lecture.
- Several seniors thesis which related to my system, gave me some idea how to start the system and also in the part of interface design, chart flow and Dictionary data that help- me to design a new one interface for my system with a simple and completely.
- There are many report that I used for my reference that related to my thesis such as;

i. Ooi Ling Sern (Seesion 2001 / 2002)

- Title of thesis" Automated Scheduling System for FCSIT"

ii. Har Wai Keong (Session 2000 / 2001)

- Title of thesis "Student Information System"

iii. Wong Hei Ching (Session 2000 / 2001)

- Title of thesis "Student Information System"

iv. Cham Yim Kim (Session 2000 / 2001)

- Title of thesis "Leave Management System"

v. Lim Tong Leong. (Seesion 2001 / 2002)

- Title of thesis "Academic Advisor System"

vi. Ong Soh Pun (Seesion 2001 / 2002)

- Title of thesis "FCSIT Course Scheduling System"

All these references help me how to develop my system.

3.2.5 Internet Surfing

- Internet act as a very good resource for seeking information needed in the development of this project.
- It is browsed to seek information on the various online registration systems available for collaged and universities.
- There are two engine searching that I usually used such as;

i. Yahoo.com

- Search " http://www.groupware.itil .com/leave.html

ii. Google.com

- Search " http://bcmp.med.harvard.edu/room.html

- The information that I found to help me;
  i. The information of ASP
  ii. Types of methodologies
  iii. Types of interface
  iv. Existing system for leave management

At the end of the analysis, information and requirements are compiled to developed the system.

3.3 Requirements Analysis

3.3.1 Function requirement

The function requirement describes the services or modules that a system must provide, or in other words they are the thing that the system must do. Base on the synthesis SMACAP system. I have identification the functional requirement for this system;

i. User sub-module
   - This system provides this sub-module just for administrator.
   - Administrator will manage and maintenance the user password and login.
   - Administrator also input data for a new lecturer and give a password and login so that they can access this system.

ii. Long Leave sub-module
   - This sub-module can access by DDA, HD and lecturer in FCSIT.

- Lecturer will input data when they decided to take long leave and click the "submit "button.
- Lecturer could view their long leave application status.
- HD and DDA will discuss in meeting manually and pass the result by email if that application approve or not.

iii. Courses sub-module

- This sub-module can access by DDA, HD and lecturer in FCSIT.
- DDA and HD assign the courses to lecturer depend on their credit hours and could view all lecturers' courses.
- Lecturer could view their course that have been assign by DDA and HD

iv. Lecturer sub-module.

- This sub-module can access by Administrator, DDA, HD and lecturer in FCSIT.
- Administrator input data for the new lecturer such as their credit hour, and department to add the record.
- DDA and HD could view all lecturers in their department and their courses that have been assigned.
- Lecturer input their personal detail and three courses that they interested.

v. Login sub-module

- All users in this system could change their password.

- A login is vital for this system to protect information and database from non-authorized user.
- User should enter user identity and password before access to smacap system.

3.3.2 Non-Functional Requirement

The non-functional requirement describes other feature characteristic and constraint that define a satisfactory system. On in other words, there are properties that the system must have. The following there are three major categories of non-functional identify for smacap;

i. Product requirement

- These are requirement that specify product behavior.
- Example include performance requirement of how fast the system must execute and how much memory it requirement; reliability requirement that set out the acceptable failure rate; portability requirement and usability requirements.

ii. Organizational requirement

- These are derived from policies and procedures in the customer's and developer organization.
- Example includes process standard which must be used; implementation requirement such as the programming language or design method used;

and delivery requirement which specify when the product and its documentation are to be delivered.

iii. External requirements

- This broad heading covers all requirement s which are derived from factor external to the system and its development process.
- These include interoperability requirements which define how the system interacts with system in order organization.
- Legislative requirements which must be followed to ensure that the system operates within the law and ethical requirements.
- Ethical requirements are requirements placed on the system to ensure that it will be acceptable to its user and the general public.

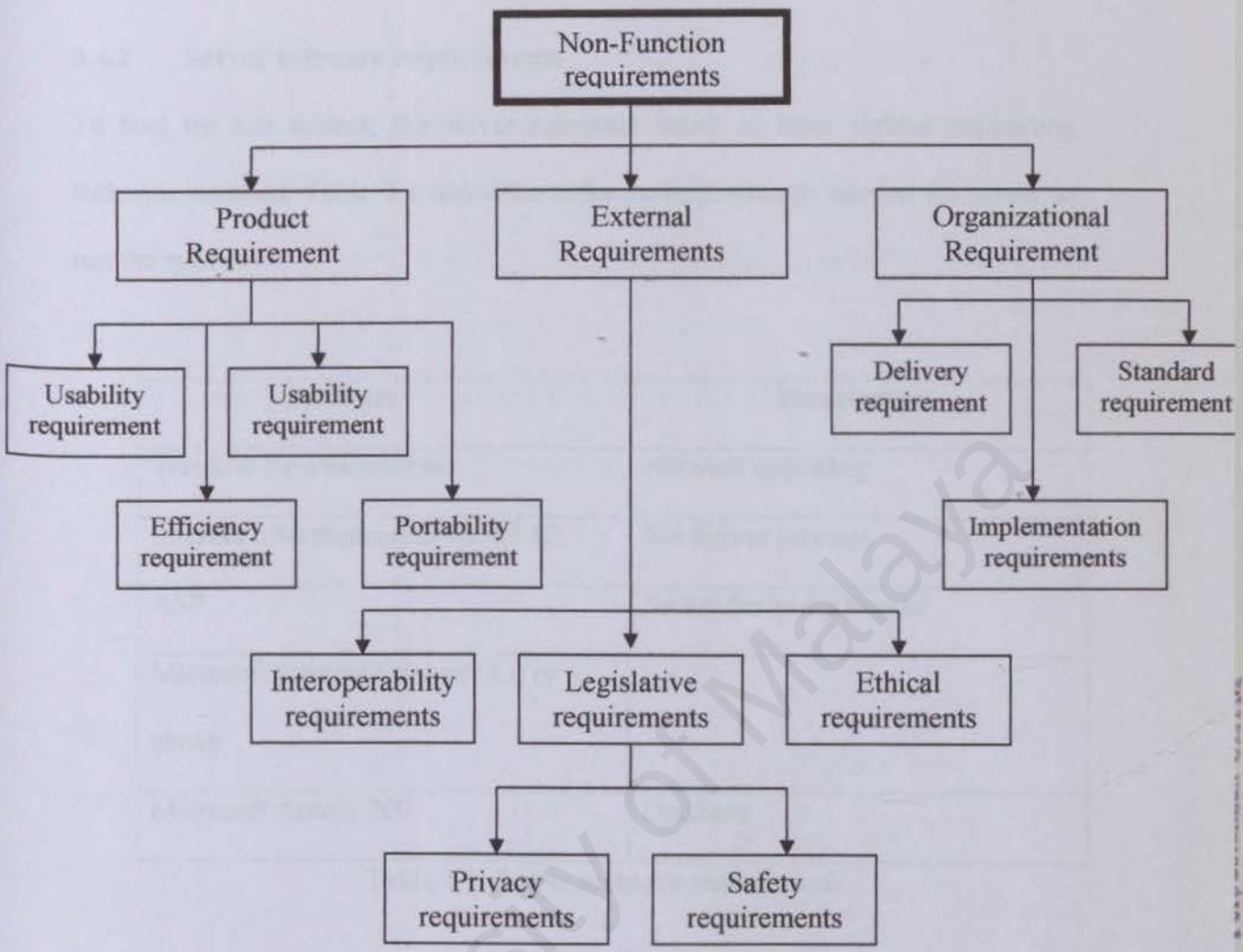

Figure 3.4; Types of function non-requirement

3.4 Software and Hardware Requirements

3.4.1 Server hardware Requirements

The server computer hardware requirements are;

- A server with at least Pentium 166 MHz processor
- At least 32 Mb RAM
- Other standard computer peripheral.

3.4.2 Server software requirements

To host the run system, the server computer needs to have various supporting software installed. Table 3.1 describes software requirements needed for server to run the system;

Software	Description
Window XP Professional	Network operating
Internet Information Server 4.0 IIS	We Server services
ASP	Server Scripting Engine
Microsoft Internet Explorer 4.0 or above	
Microsoft Access 200	Database

Table 3.1; Server software requirements

3.4.3 Client Hardware requirements

Smart Academic Planning system hardware requirements are quite minimal. Below are recommended requirement for the system;

Processor;

Memory; 16 MB or more

Modem; 28.8 Kbps or better

3.4.4 Client Software Requirements

The client software requirements fall on the browser used by the user. The system can support most of the browser and operating system is available. Below are recommended software requirements to use of the system;

Operating System; Windows 95 / 98 / 2000 / NT / XP Professional

Internet Browser; Microsoft Internet Explorer 4.0 or above

CHAPTER 4 - SYSTEM DESIGN

Design is the creative process of transforming the problem into a solution. System design is a process thought which requirements are translated into a model or representation of the software that can be assessed for quality before coding begins. At this stage, the requirements identified earlier are translated into system features and characteristic.

4.1 PROCESS DESIGN

Part of the design must describe the processes that make the system work. The primary objective of process design is to correctly define the entire task in the processes and to ensure they fit together. This task must transform and move the data in the way specified by logical design.

4.1.1 System structure chart

The system structure based on the functional modules. Figure 4.0show the system structure chart for FCSIT's Smart Academic Planning (SMACAP) and its modules. This system is desktop application that only can access by Dean of Academic and lecturer in FCSIT. First, user need to insert their user ID and password before they can access any of the modules for this system.

After the password and ID had been identified, user could access any modules that had been available. There are two main modules such as Administrator module

and user module. And five modules such as lecturer module, course divided module, leave module, reminder module and meeting module will be shown after we choose either Administrator module or user module for beginning. Four modules were added to complete this system are contact, event UM, calendar and also logout.

Actually in this system, Deputy Dean of Academic's module can't access by other lecturer. The ID and password will require before access these modules. According to the view point hierarchy as shown below, the Deputy Dean of Academic and Head of Department modules and also did not know what services they have from this system.

The flow chart of view point hierarchy of SMACAP system below had shown the whole services that available for Deputy Dean of Academic, Head of Department and lecturer.

View Point Hierarchy of Smart Academic Planning in FCSIT

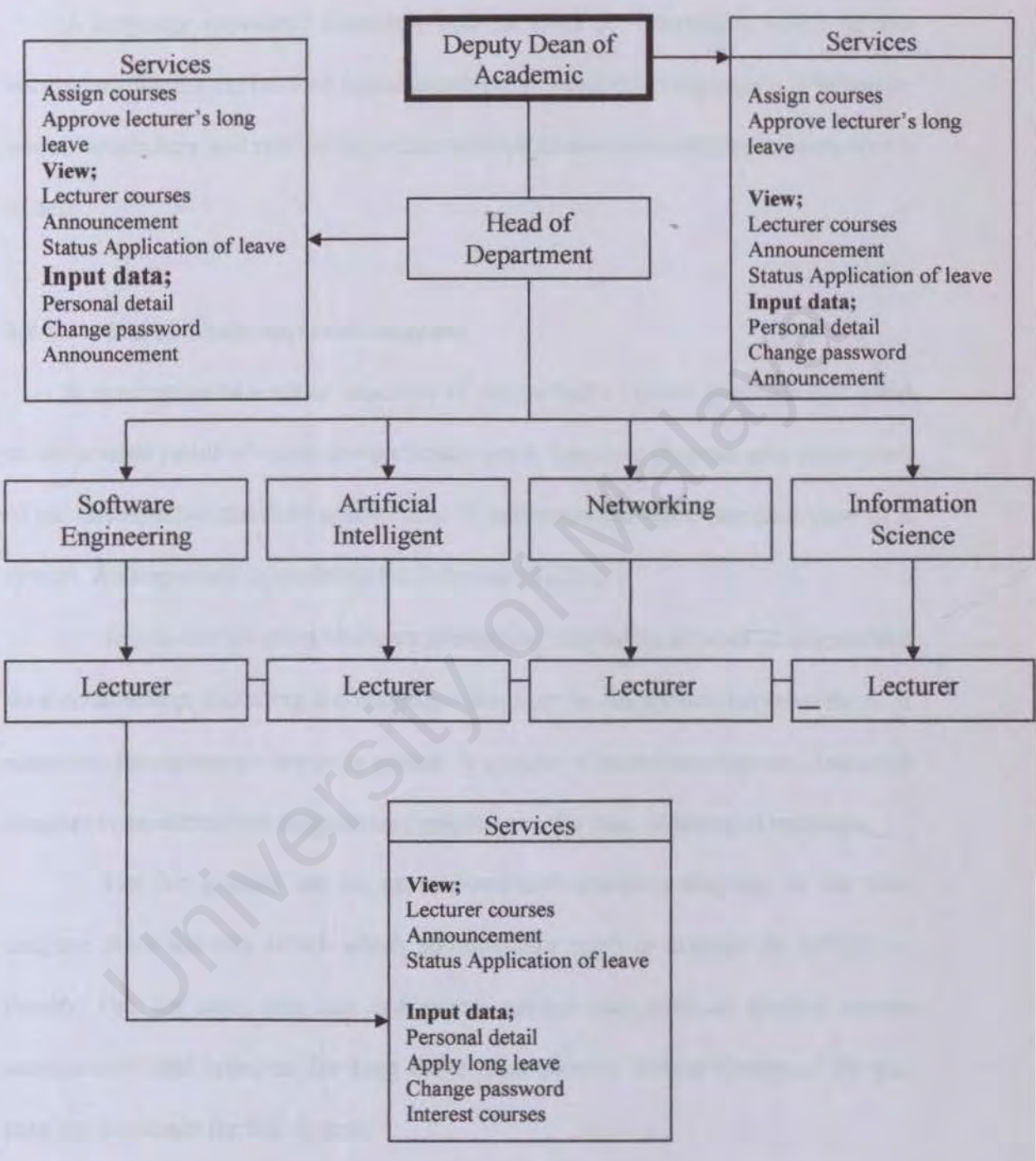

Figure 4.1; View Point Hierarchy for SMACAP

4.2 THE UML LANGUAGE

A language provides vocabulary and the rules for combining words in that vocabulary for the purpose of communication. A modeling language is a language whose vocabulary and rule focus on the conceptual and physical representation of a system.

4.2.1 Use case and sequence diagram

A description of a set of sequence of action that a system performs that yield an observable result of value to a particular actor. Use case diagram also show a set of use cases, actor and their relationship. It addresses the static use case view of a system. An important in modeling the behavior of system

Interaction diagram show an interaction, consisting of a set of objects and their relationship, including the massages that may be dispatched between them. It addresses the dynamic view of a system. It consist of sequence diagram. Sequence diagram is an interaction diagram that emphasizes the time ordering of messages.

For this system, we use an use case and sequence diagram. In use case diagram there are two actors which administrator need to manage all activity in faculty. But for user, they can not access certain part such as divided course management and approval for long leave management. Below shown of the use case and sequence for this system;

4.3 DATABASE DESIGN

In database design, structure and framework of the database is defined Academic Planning for FCSIT's system database based on the relationship between rows one represented by data values. It involve the activities of modeling the structure of the database so that the data or record in database can be created , updated, deleted and or displayed at the direction of the user. To do this, the database structure is determined first and followed by defining all the fields in the tables in the data dictionary. All these are discussed as below.

4.3.1 Database Structure

Using Microsoft Access 2000 as the database platform, the database connects to the SMACAP application through open database connectivity (ODBC). The connection is mapped through a Data Source Name (DSN) in the ODBC. The DSN that is designated for this project is "smacapdev".

4.3.2 Database design consideration

A good design should exhibit the following characteristic;-

a) Minimal data redundancy

- Duplication of data in the database should be minimal.
- Although there will be some redundancies in a database (e.g. the key field), such redundancies however are controlled.

b) Data consistency

- If the same data is stored in multiple tables, then they should be identical.

c) Data integration

- Data stored in one tables should be easy accessible from other related tables.

d) Data sharing

- Often there will be many users who share the same database.
- Each user may be given a view of database. A view roughly corresponds to a subset of the database field.

e) Provide security, privacy and integrity control

- There must be proper control for accessing, updating and protecting data. This often requires setting standard and procedures.

f) Data accessibility and responsiveness

- User should be able to cross the information stored in a database using simple command.

g) Data independence

- Data should be separated from the application program that use the data . In other words, the data stored in the database can change without necessitating change in the application

h) Simplify application development and maintenance

- Developing and documenting application should be easy and fast

4.3.3 Data Dictionary

The Long Leave Module system shares a common database named LLMS. Below are some of the existing tables in the database;

4.3.3.1 TABLE courses (cs_id)

course				
s_id	cs_name	s_desc	cs_credit_hours	cs_status
US122	Bussiness	iplo	3	Yes
TT223	Networking	iplo	3	Yes
TT224	Database	iplo	3	Yes

4.3.3.2 TABLE Long leave(lev_id)

leave								
lev_id	lev_lec_id	lev_date	lev_year	lev_sem	lev_reason	lev_dpt_id	lev_apr1	lev_status
5	LEC111	2/2/2003	2004	1	asdasdsa	1	Yes	Approve
6	LEC111	2/2/2003	2004	1	asdasdsa	1	No	Reject
8	LEC116	2/2/2003	2004	2	asdsa	1	No	Approve

4.3.3.3 TABLE Lecturer's courses (lev_cs_id)

lec_course					
lec_cs_id	lec_id	cs_id	main_id	status	year
121	LEC114	ITT223	3	ok	2004
124	LEC112	MGT234	19	ok	2004
126	LEC111	ITT227	21	ok	2004

lec_course					
lec_cs_id	lec_id	cs_id	main_id	status	year
127	LEC112	ITT227	21	ok	2004

4.3.3.4 TABLE Lecturer (lec_id)

lec_id	lec_name	lec_phone	lec_email	lec_interest1	lec_interest2	lec_interest3	lec_chours	lec_chours_left	
DEA100	Dekan		mus@yahoo.com				0	0	30
LEC111	Mustafa	012-865656	mus@yahoo.com	BI223	ITT224	QMT347	9	2	30
LEC112	Ismail	012-454662	is@yahoo.com	ITC223		ITT223	9	-1	30

4.3.3.5 TABLE Message (msg_id)

msgbox						
msg_id	msg_date	msg_subject	msg_content	msg_u_id	msg_from_id	msg_status
1	12/12/2003	hoi	kakakakaka	1	2	Yes
8	11/22/2003	fbf	gdjhfkh	1	2	Yes
9	11/22/2003	sdfg	xfdgd	1	2	Yes
10	11/22/2003	hi	joiasdsad	4	1	Yes

4.3.3.6 TABLE User(u_id)

users								
u_id	u_login	u_pass	u_name	u_email	u_dpt_id	u_level	u_reg_date	u_last_login	u_statu
1	admin	1234	administrator	admin@ smacap.com	1	Admin	12/12/2003	2/20/2004	Yes
2	LEC111	1234	lecturer	hwhw@ yahoo.com	1	Lecturer	12/12/2003	2/20/2004	Yes
3	LEC112	1234		admin@ smacap.com	2	Lecturer			Yes

4.3.3.7 TABLE Year (id)

years			
id	year	sem	status
3	2003	1	old
4	2004	1	current
5	2003	2	old

4.3.3.8 TABLE Department(dpt_id)

department		
dpt_id	dpt_name	dpt_desc
1	SE	

department		
dpt_id	dpt_name	dpt_desc
2	IT	
3	AI	

4.3.3.9 TABLE Guestbookr (id)

guestbook				
id	nama	email	komen	tarikh
38	TEST	fgsddhfs	fdshdfshdfhsdf	9/7/2003
53	SDDADFASD	asdsa@yaho.com	sdasdsadsadsa	9/28/2003
55	KAU	aku@aku.com	asdasfagngdsfb	9/28/2003
63	DFDS	dsf@yahoo.com	sadsadsadsa asdsa dsadas	10/21/2003

4.4 User Interface Design

User interface can be considered on of the most important aspect of web application design. The interface provides a platform for the user to interact with the system. Without a good interface design, a user is enabling to make full use of the software. Poor interface design, also make the user feel frustrated when using the system. Hence different factors have to be considered in user interface design so as to ensure that the user is comfortable is using smacap system and help is

provided if the user uncounted problem. Below are descriptions of each factor which are taken in user interface design;

4.4.1 Colour

- Colour plays an important part of interface design because colour will set the mood of the user when using the system.
- Too bright colour may be distractive to the user while dull colour makes the application seem formal and difficult to use.
- The types of the colour also play a part in the interface design.
- The system SMACAP a orange theme for its interface design. As the system intend to be formal.
- Black text on white background provides the necessary contrast for the user to see the text clearly.

4.4.2 Typography

- One of the main factors to consider when choosing the typography is the availability of the font type.
- The SMACAP system uses Arial font through the application as that font has high readability for either short or long section text.
- Bold face is also used to differentiate text section or to grab a user's attention. Different font size s are also used to create focus certain areas.

4.4.3 Consistency

- The SMACAP system tries to maintain the same look or feel between the pages of the application, such consistency is very important as it allows user to see the relation between each screen of the application.
- To achieve this consistency, Cascading Style Sheet (CSS) is used. Cascading Style Sheet (CSS) allows the separate of style from the content of an HTML or VB document. This feature enables the alteration of the entire document or web application by only editing the Style Sheet..

Chapter 5 - System Testing

5.1 Introduction

System testing is the major quality control measure during prototyping. Testing is performed to ensure that the program is executed correctly and confirms to the requirement specified. It provides a method to uncover logic errors and for testing system reliability.

The objectives of testing are stated below;

a) Testing is a process of executing a program write the intent of finding an error

b) A good test case is one that has a high probability of finding an as-yet undiscovered error.

c) A successful test is one that uncovers as-yet undiscovered error.

The testing phase consists of test case design and testing strategies.

5.2 Test case design

Before testing is done, a method should be chosen to follow. These methods provide a systematic approach to testing. More important, method provides a mechanism that can help to ensure the completeness of test and provide the highest likelihood for uncovering errors in software. (Pressman, 2201)

Two types of test case design were used in this system

a) White-box testing

b) Black-box testing

5.2.1 White –box testing

White box testing, sometimes class glass box testing, is a test case design method that uses the control structure of the procedural design to derive test cases. Using white box testing methods, the developers can derive test case that;

a) Guarantee that all independent paths within a module have been exercised at least once.

a) Exercise all logical decisions on their true and false sides.

b) Execute all lopes at their boundaries and within their operational bound.

c) Exercise internal data structures to ensure their validity.

The testing was carried out at the early stages of the testing process to ensure that the internal operation of the system performs according to specification.

5.2.2 Black-box testing

Black box testing assumes that the logic structure of the code is unknown. It is a black-box, this point at which the function of a module is tested. Black-box testing also called behavioral testing, focuses on the functional requirements of the software. That is, black box testing enables the software engineer to derive sets of input conditions that will fully exercise all functions requirements for a program.

Black-box testing is not an alternative to white box techniques. Rather, it is a complementary approach that is likely to uncover a different class of errors from those uncovered by white box method.

Black box testing attempt to find error in the following categories;

a) Incorrect of missing functions.

b) Interface error

c) Error in data structure or external database access

d) Behavior error performance errors.

e) Initialization and termination error

5.3 Three stages of testing a system

Testing is critical phase of its quality control and assurance. Testing represents the complete and extensive review and challenge on application design, specification and codes. Several rules serve well as program testing objective;

a) Testing is process of program execution with explicit intents to find errors and run time program bugs.

b) An effective test case is one which contains unexpected testing record set with high probability of detecting undiscovered errors during the program design and development phases.

c) A successful test is also not which uncovers only few expected errors, it is one which constantly provides new challenges to its programmer over time

The system has undergone 3 stages of testing. They are unit testing; integrating testing and system testing are shown in the figure 5.1 below.

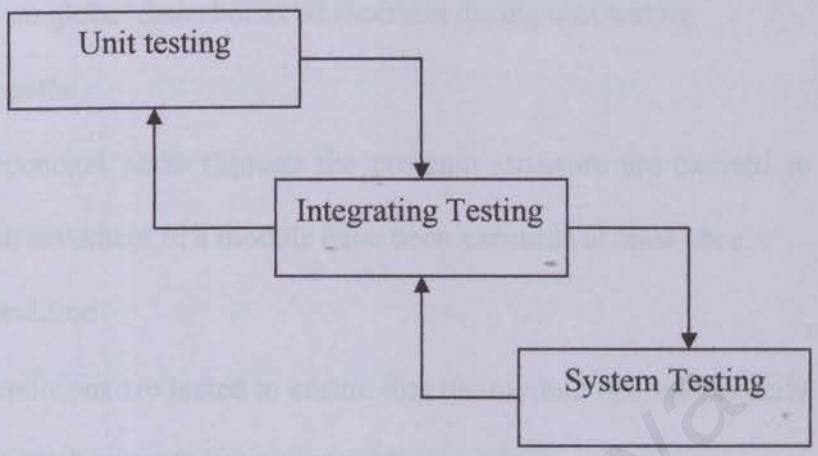

Figure 5.1; Show the state of AAS

5.3.1 Unit Testing

Unit testing focuses verification on effort on the smallest unit software design that is system module. This step, all important control structure is tested to uncover errors within the boundary of the module by using the component level design description as a guide.

Unit test involves 5 important test cases there are;

a) Interface

- Module interface is tested to ensure that information properly flow into and out of the program unit under test.

b) Local data structure

- Local data structure is examined to ensure that data store temporarily maintains its integrity during all step in an algorithm's execution and the local impact on global data should be ascertain during unit testing.

c) Independent paths

- All the independent paths through the program structure are excised to ensure that all statement in a module have been executed at least once.

d) Boundary condition

- Boundary conditions are tested to ensure that the module operate properly at boundaries established to limit or restrict processing.

e) Errors handling paths

- All- errors handling paths are tested to ensure its ability to detect and recover all fatal errors during execution.

5.3.2 Integrating testing

Testing a specific feature together with either newly developed feature is known as integrating testing. In other word, when the individual components are working correctly and meet the objectives, these components are combined into a working system. Testing the interface of 2 components explores how component interact with each other.

There are a number of different integration strategies available including top-down integration, bottom-up integration, regression testing and smoke testing. Based on the system characteristic and project schedule, a combined approach that

uses top-down test for upper level of the program structure, coupled with bottom-up test for subordinate levels was selected as AAS system integration testing.

Top-down integration beginning with main control module as a test driver and stubs are substituted for all components where modules are integrated moving downward through the control hierarchy. Test is conducted as each component is integrated. Top-down integration enables the detection of design error early in the testing phase and avoiding extensive redesign or re-implementation.

Bottom-up integration begins construction and testing with atomic module where low level components are combined into cluster to perform a specific system sub function and tested. Bottom down integration is an easier test case design because processing required for component. Subordinate to a given level is always available and the need for stubs is eliminated.

5.3.3 System testing

System testing is last procedure of testing. System testing is different with unit testing and integration testing. System testing is designed to find out bugs that can be attributed to individual component and interaction among component and other objects. System testing can test an issue and behaviors that can only be exposed by testing the entire integrated system or major part of it. System testing will ensure functioning properly and all design and development objective are met. Several steps to test AAS include function testing, performance testing and acceptance testing.

5.3.3.1 Function testing

Function testing will be a first step of system testing. This focuses on system functionalities. The function may involve the whole system, sub module and individual module. The effective function testes will perform high probabilities to detect system fault. AAS function test involve;

a) High fault detection probabilities

b) Test all valid and invalid input data type

c) Include stopping criteria

5.3.3.2 Performance testing

Performance testing assign to the non-functional requirement of AAS. System performance is ensuring the performance of system reach objective set by potential user as highlighted in the non-function requirement section guidelines.

5.3.3.2 Acceptance Testing

After completing theses two testing (function testing and performance testing).AAS is determine to be able all requirement specified during initial stages of its development. The final testing will involved it potential user. User led acceptance testing and defines their own real-time business data sets to be used to test cases. This allows user determine usable of system.

CHAPTER 6 - SYSTEM IMPLEMENTATION

System implementation is a phase interoperating the designed modules or function to develop a system a system based on the given requirement. In order to achieve that, appropriate tools and language are needed to code the program. A number of software was chosen in this case. This phase at time involves some modification to previous design. AAS was also developed using the bottom-up approach, which involves building the functions and procedures and than high-level software modules.

6.1 Development tool

The overall tools used for the development of this project are;

i. Operating system
   - Windows XP professional

ii. Web server
   - Internet Information Server (IIS)

iii. Database Development
   - Microsoft Access 2000

iv. Programming coding
   - Server side scripting- Active server pages (VBscript)
   - Client side scripting – (java script)

v. Browser

- Internet Explorer 5.0

vi. Web application development tool

- Microsoft Dreamweaver MX
- Adobe Illustration

6.2 Operating system

The system is developing using Microsoft window XP professional, because it was special designed for web server operating system and support Internet Information Server (IIS). This makes the system easier to test.

6.2.1 Web Server

Internet Information Server IIS was used as the web server to browser the system in the Internet Explorer 5.0. This is necessary because we need to view the result of the coding as well during the implementation stage.

6.2.2 Database development

Microsoft Access was used during the entire program development. It was chosen of the high capacity and ease to use. 11 tables were created for used by the system. Some of the tables have relationships with some other table and some are not.

6.2.3 Program Coding

Active Server Pages (ASP) is chosen as a Server Side Scripting and VB Script is chosen as the default scripting language for ASP. ASP code is always inside the server script delimiter, < %....%>. For client side scripting, Java scripting is chosen as it is more widely supported by majority browser. Hypertext Markup Language (HTML) is also used.

6.2.4 Browser

AAS is best viewed with Internet Explorer Version 5.0

6.2.5 Web application development tools

During the whole development of AAS, Microsoft Dreamweaver MX was used. Microsoft Dreamweaver MX was used most for ASP coding as it help to differentiate between ASP codes and normal HTML code.

6.2.6 Graphic Creation

Adobe Illustration used to create button.

6.3 System coding

After each function is done, testing is done to check whether it works. Then, error checking will be inserted to make sure that if error occurs, it can be detected.

6.3.1 Coding Approach

AAS was developed modularly, mainly by using the bottom-up approach. This approach develops function and procedures before proceeding to the higher-level modules. Below here are examples of the code in ASP;

i. Coding to connect to a database.

Firstly, a system DSN (Data Server Name) must be created in ASP to connect to DSN, the code below is needed to connect to the Microsoft Access.

```
Set conn = Server.CreateObject("ADODB.Connection")
strDbPath = Server.MapPath("\smacap\database\smacap.mdb")
connStr = "DRIVER={Microsoft Access Driver (*.mdb)};DBQ=" &
strDbPath
conn.Open ConnStr
```

In the code, a connection object is created in ASP. This uses the CreateObject method of server object to create an instance of the connection object. It is then given the name Set Conn. "Server.MapPath" to identify which file in database and given to the name strDbPath. In this system we use Microsoft Access Driver. Then, open the connect "ConnStr". Data source is the Server name and Initial catalog is the database name.

ii. Coding to open a table in a database and query

After connecting to the database, the data store from the database table needs to be Kept some place where we can refer to it. This time, the Recordset object is used to store the data captured from the data store. The open method is used to create a Recordset. The syntax for the open method is;

```
if request("btnRemove")<>"" then
asg=split(request("lid"),",")
sql="select cs_credit_hours from course where
cs_id='"&request("course_id")&"'"
rs1.open sql,conn
x=rs1(0)
rs1.close
```

In this syntax, when button remove click by user for request "" then split the ", "and select the cs_credit_hour from the table course in database given name "sq1". Here

rs1.open sql,conn

this syntax to open sq1 that connection to database and set to rs1.

set rs1=server.CreateObject("ADODB.recordset")

in this syntax we can found from database connection in folder include. To close this syntax such as "rs1.close"

iii. Coding to get result from form

After the user submitted the form, the data must be processed and inserted to the database. The method to extract the data from the form is as below.

```
sql= Request.Form ("course_id")&"'"
```

Request.Form is used to extract the data from the form field, username. This is inserted into the field into a variable call sq1.

iv. Coding on using session object

Session object are used to store info that can be accessed by the client. Session can be used to track user to make sure users are allowed to certain Web Pages only. In AAS, session object is used to make sure users are registered before they attempt to back session object timeout in 20 minutes. To abandon the session, use the "session Abandon" method. This is use when user logs out from the system. Below here is how AAS use session to make sure they register;

```
if session("level")="Lecturer" then
```

6.3.2 Coding Style

Good coding practice is needed to avoid or detect errors easily;

i. Include files

Using include file a once like procedure. It is used when certain codes is repeated again. It allows procedures to be available to may ASP's files. In AAS, include file are used on ASP pages which need database connection

Below is an example how to declare include file in ASP pages.

```
<!--#include virtual="/smacap/include/conn.asp"-->
```

ii. Indent Codes

Although it is not necessary to indent the code to ensure that the code works correctly, but it will be easier to read and detect error if the codes are indented. It will be most useful in code which used many control structure, for example. For loop, if-else, do-while and select-case.

iii. Comment code

Commenting the code will make it easier for the other people to understand the code. Sometime, it also helps ourselves to understand what we wrote few weeks ago. In ASP, the single quotation mark is used to add comment

Below is an example of it

strDbPath = Server.MapPath("\smacap\database\smacap.mdb")

Comment = "Find the folder smacap in database and given name strDbPath"

iv. User Subprocedures

Sub procedures are very useful to optimize the code. As more codes are written, more and more Asp code again, the repeated code can be put into a sub-procedures and then, call it when it is needed.

CHAPTER 7- EVALUATION

7.1 Introduction

System evaluation is the process of identifying the system strength and limitation and possible enhancement of the smacap application. The process also helps developer to identify problem faced and solution to that problem during the development of application. Through the evaluation process, developer could determine how far the system has achieved it objectives and fulfill the user requirements.

7.2 System Strength

7.2.1 User friendly Interface

The system interface is interesting due to the using of graphical user interface (GUI) concept. The interface uses menus, buttons and text boxes which make the system relatively easy for users to learn and use. User should find the system user friendly and interesting without needing much skill on handling it. It creates no difficulties to novice who is unskilled in using the keyboard and mouse.

7.2.2 Security System

Only authorized user who have login authentications is allowed to manipulate and make changes on the database information. User must login using their password if

they want to access smacap system. The administrator could change their password by entering the old password correctly.

7.2.3 Validation of data input

User's input is validated and verified through using client side scripting and server side scripting. The purpose of data validation is to ensure that every database field correctly.

7.2.4 Retrieving and manipulating records.

The application allows efficiency ways in retrieving and necessary records on the screen; it is easy on manipulating records found in the database, such as adding new records, editing and deleting existing records.

7.3.1 Timetable print out

Smacap system provides a timetable print out for the user. It easily for them to print out the document that can be use for reference For example, when Deputy Dean of Academic or Head of Department access to course sub-module and click the view all to know the overall of courses that have been assigned to lecturer, they can print that page just press the button "Print this button".

7.3 System Limitation

7.3.1 Schedule courses by student

There is no student section in this system. Students are not permitted and undertake scheduling of courses assigned to them. Student is not allowed to choose and set their preferable teaching time.

7.3.2 Help facility

The system does not provide help feature to assist user on how to use the system.

7.3.3 Reminder facility

The system does not provide reminder facility automatically to inform the user especially in long leave sub- module.

7.3.4 Personal Detail

The system does not provide personal detail for Deputy Dean of Academic and Head of Department especially in course sub-module

7.4 FUTURE ENHANCEMENT

7.4.1 Help facility

The system could provide help feature to guide user on how to use the system. The help facility could assist user by explaining the time table process, and way of adding, editing and deleting data. User could access to help facility by clicking the help button.

7.4.2 Database management

The application should give user fully control over the database used, where they can ??? their own maintenance such as backup and compacting the database.

7.4.3 Reminder facility

The system could provide reminder feature to remind the user especially in long leave sub- module. For example, the reminder wills pop-up when any lecturer will come back from sabbatical three weeks before.

7.4.4 Personal Detail

This system should have personal detail page for Deputy Dean of Academic and Head of Department to show that they also can choice which courses they interested, because there are 3 and 6 credit hours for them to lecture for one semester.

7.5 PROBLEM AND SOLUTION

Various problems were faced during the development of smacap system. However, these setbacks were eventually solved or reduced. The problem and solutions are descried below;

7.5.1 Difficulty in designing a good database

Due to the complicated of timetable in this faculty, it is very difficult to design a good database to store information needed in scheduling process.

With the guidance from project supervisor, senior and some example from reference books, a suitable database design was created to manage all the information.

7.5.2 Difficulty in choosing a suitable system development tools

There are too many system development tools available for develop a web-based application. Choosing suitable tools is very important because the use of suitable tools could speed up the system development life cycle a minimal the unexpected bug and error

To determine the suitable tools, I have sought for advice from my course mates and senior who have experience in develop web-based application. Beside, surfing through the internet and visiting the library help clarify some doubt. Finally, I managed to choose the suitable tools and programming language that could be used to develop this application.

7.5.3 Time constraint

There was not enough time to study, learn and produce a best solution of design in semester I. Mainly; this was cause by inexperience and insufficient knowledge of designing a system. Furthermore, time is needed to study and explore ASP language, HTML and Microsoft access 2000 before knowing how to apply these technologies and languages in the process of developing and solving problems.

These I have made a lot of reference to these who are familiar with these languages and technologies. In addition, I read reference books to catch up on how to build a good system using these languages and technologies.

7.6 Evaluation on objectives achieved

Basically, the developed system has achieved most of its main objective defined during the analysis phase and has met the functional and non-functional requirement.

In smacap, it allows the administrator to input related information into the system. The information includes course's information, lecturer's information and long leave information. The entire information will be store in database. Beside that, this system allows all lecturers should key in the interested subjects and their personal detail. This data should be use by Deputy Dean of Academic and Head of Department to assign the courses depend to their experience.

In conclusion, smacap system has achieved the following objectives;

a) Reducing the time and effort to generating course to lecturer. It could speed up the generations of assigned course to lecturer in our faculty.

b) Help Deputy Dean of Academic and Head of Department to assign the courses based on their interested courses. It can make a good lecture if teach by an experience lecturer.

c) Deputy Dean of Academic and Head of Department can know which lecturer will tale a long leave before they assign the course.

7.7 Project conclusion

As a conclusion of this project, smacap has fulfilled the requirement to deliver the system in time and achieved most of the objective and requirement as determine during any phase.

Throughout this project, I have learned and gained a lot of valuable knowledge and experience. During the period of system development, I become clearer on how to establish the connection database, maintaining database, how internet technologies and ASP concept work and also how configure. It is as the web server software.

Beside that, I have gained a lot of experience in system analysis, planning, design, implementation, testing and evaluation. In addition, skill in using software such as Macromedia Dreamweaver MX, Adobe Illustrator and Microsoft access 2000 have been acquired

During the project development, Programming skill and good practice on software engineering techniques are essential and must also be applied in an effectively way. Therefore, this project has provided the good chances to experience using the method, techniques, paradigms and approaches that learned from system analysis and design and software engineering courses in the second year and third year study respectively.

The scope of this system defined through waterfall model with prototype; this makes the system most expandable in term of functionality. Thus, enhancement could still make to this system with more features added. Lastly, hoping that the

features and benefits of this system will enable the courses assigned to lecturers to become more effective, systematically and efficiency

APPENDIX - USER MANUAL

8.1 Introduction

8.1.1 About SMACAP

Smacap is an automated web-based application that developed just for Faculty Computer Science and Information Technology. The purpose of smacap is to help Deputy Dean of Academic and Head of Department to assign the courses to lecturer by using this system that reduce the time.

8.1.2 Who is going to use this system (smacap)

The user of smacap could be divided into four categories which are;

8.1.2.1 Administrator

Administrator could access administrator module to manage user module, course module, lecturer module, and guestbook module, long leave module and announcement module. They have to use their name and password to login to the system for this purpose.

8.1.2.2 Deputy Dean of Academic and Head of Department

Could access this system by key in their password and login. The successful password and login will bring them to a new page that same like administrator but there are certain function and module that not be found . For example in course module they can just assigned course to lecturer but not to key in all courses in its

specification. There are user sub-module that not including in their part but just for administrator to manage their password and login.

8.1.2.3 Lecturer

Lecturer also could access by their password and login. Their just can view what courses that have been assigned to them and also they can change their password and login.

8.2 How to access Smacap

To use smacap, the user needs to key their password and login. A successfully password will bring them to a main page;

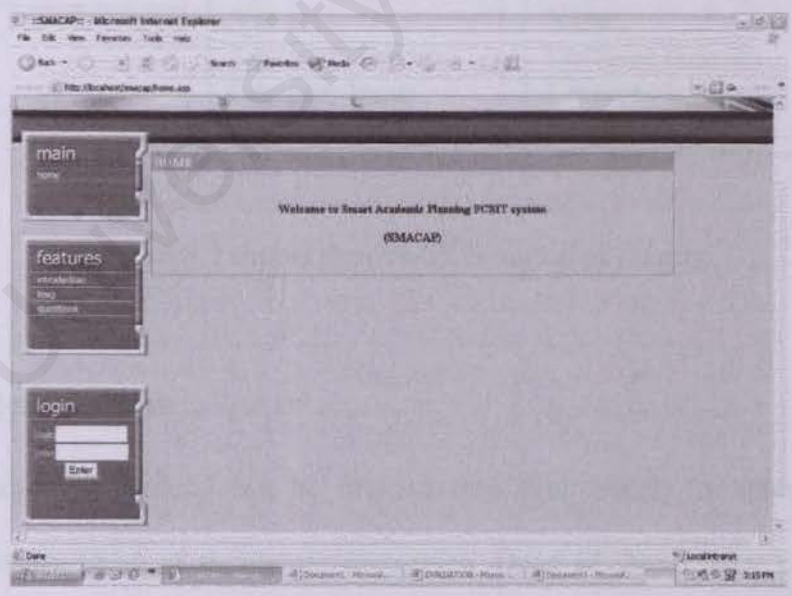

Figure 8.1; shows the main page for smacap

8.3 Overview of smacap

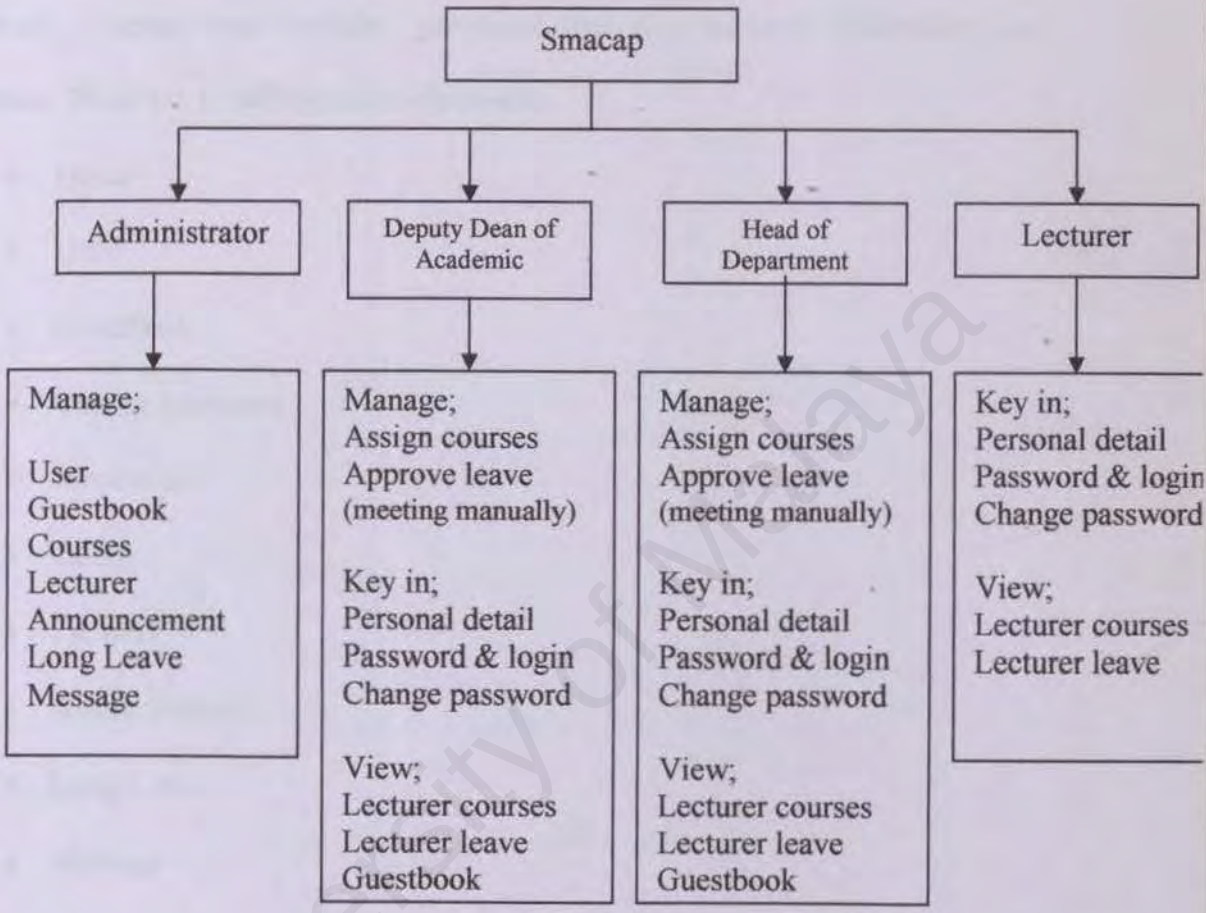

Figure 8.2 shows the overall function of smacap

8.4 System Feature

The module in smacap can be divided into four which for administrator categories, Deputy Dean of Academic categories, Head of Department categories and Lecturer categories.

8.4.1 Administrator categories

Administrator categories allow administrator to manage and maintain password, courses, user, lecturer, guestbook and also massage information in database. There are 11 sub-modules which are;

- Home
- User
- Guestbook
- Change password
- Introduction
- Course
- Lecturer
- Announcement
- Long Leave
- Massage
- Link

8.4.1.1 Login

i. From the smacap home page (figure 8.1), all user should key in their password and login and into the login form and press login.

ii. A successful login will bring them to administrator sub-module.

iii. This section allow administrator to maintain and manage the information about user' password and their login (figure 8.2). There are function can be found in this sub-module which are;

1. Add new record
2. Delete existing
3. View an email

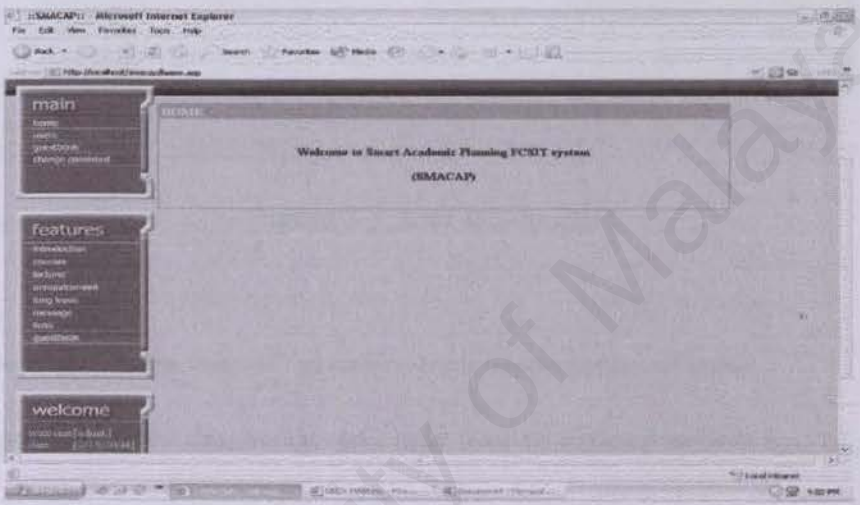

Figure 8.2; Main page for administrator

8.1.4.2 User sub-module

i. From the menu list on the left hand side (figure 8.2) Choose user sub-module and administrator will directed to the sub-module (figure 8.3)

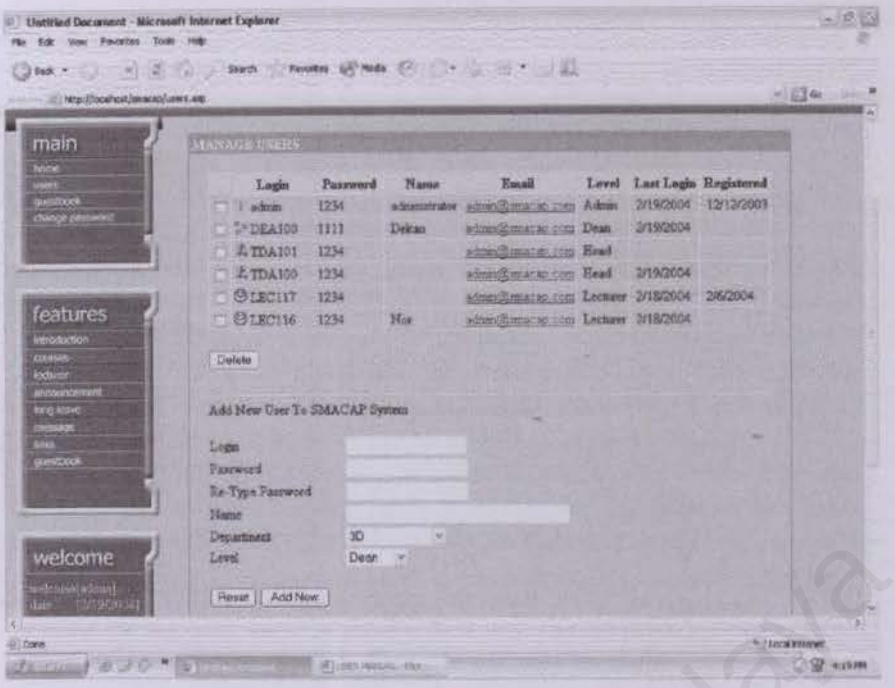

Figure 8.3; user sub-module

ii. Click on "delete button" to delete some information of user

iii. Input necessary data to the add new user to smacap system and click add new to get a new record.

8.1.4.3 Guestbook sub-module

i. Choose guestbook sub-module and administrator will directed to the sub-module (figure 8.4).

ii. There is one function "delete button", after administrator click any one in the check box and press that button so that record will be delete.

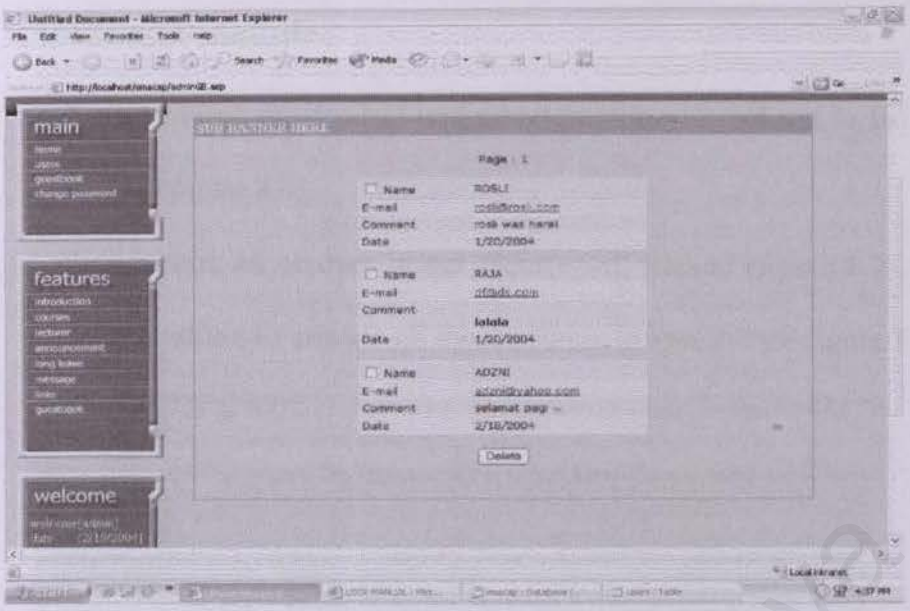

Figure 8.4; Guestbook sub-module

iii. Change password

i. Choose change password sub-module and administrator will directed to the sub-module (figure 8.5).

ii. Administrator could change their password with key in the information that required and click "change button"

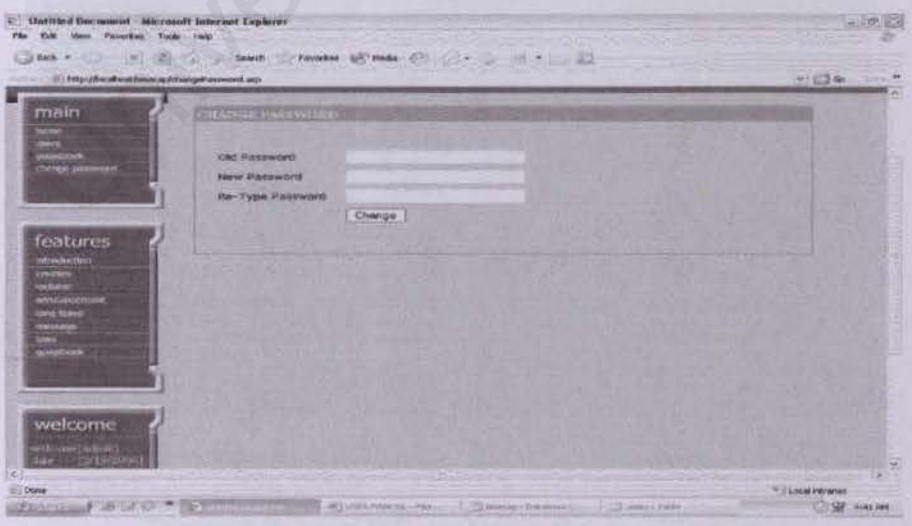

Figure 8.5; Change password sub-module

iv. Course sub-module

i. Choose course sub-module and administrator will directed to the sub-module (figure 8.6).

ii. Click admin, all courses in our faculty will pop-up (figure 8.7), then administrator will arrange all these courses in specific see figure 8.8

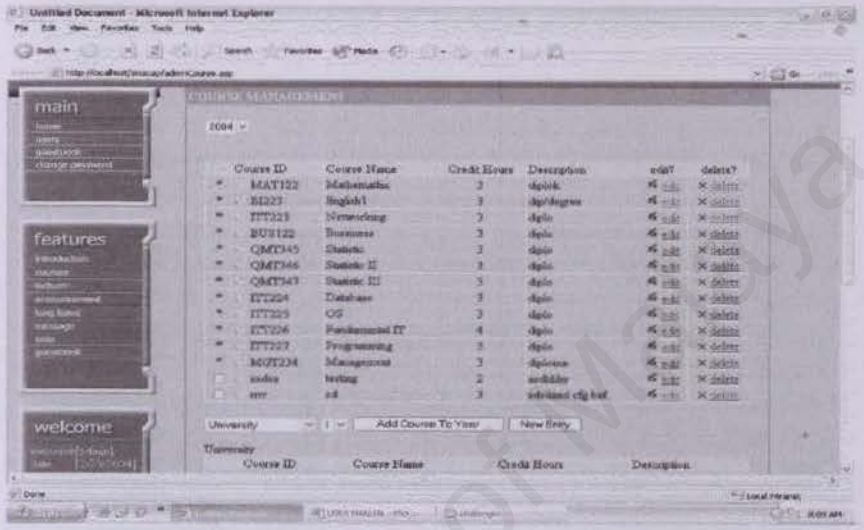

Figure 8.6; course sub-module (after click admin)

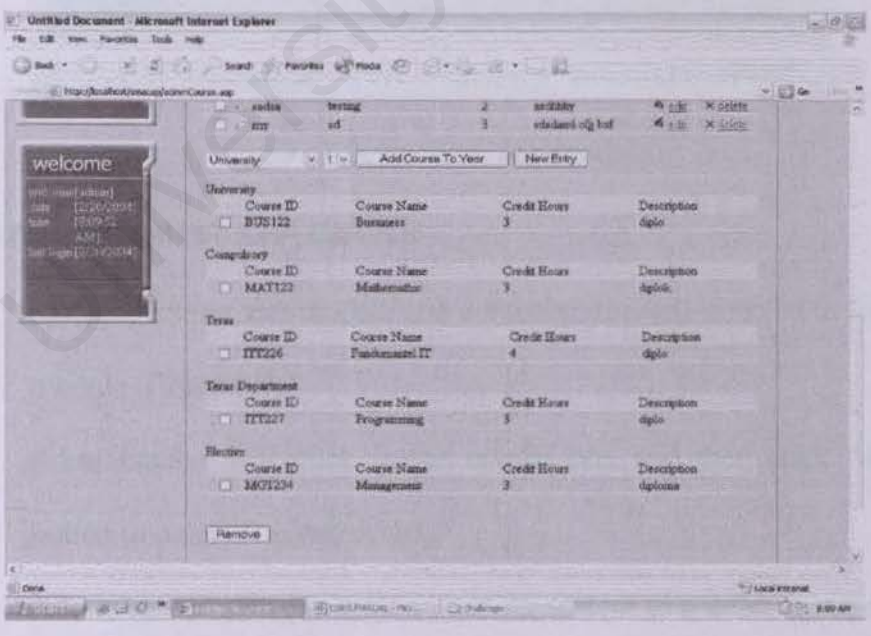

Figure 8.7; keep the courses in the specific part

v. Lecturer sub-module

i. Choose lecturer sub-module and administrator will directed to the sub-module (figure 8.8).

ii. Click in the combo box and press "delete button" to delete the record unused.

iii. Input data for a new record of lecturer and administrator will set their credit hours. See figure 8.8

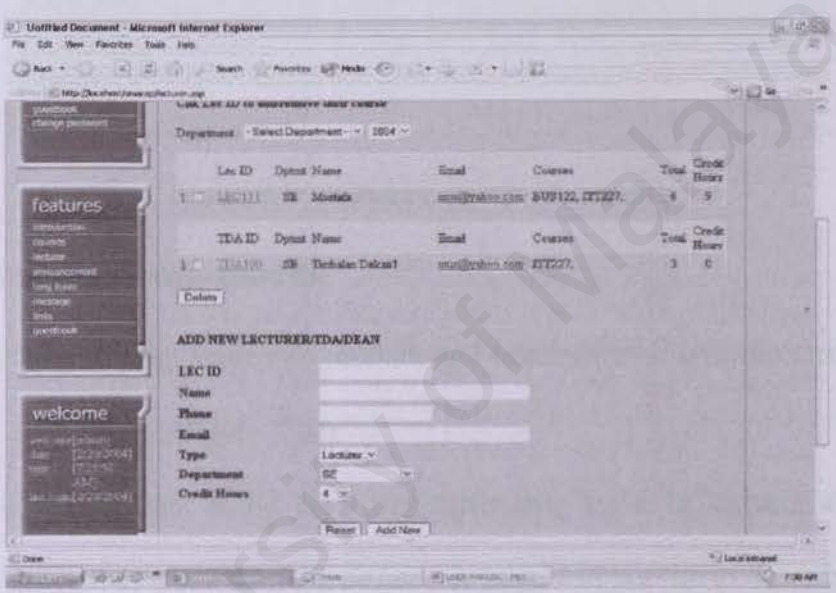

Figure 8.8; Lecturer sub-module

vi. Announcement sub-module

i. Choose lecturer sub-module and administrator will directed to the sub-module (figure 8.9).

ii. Administrator will click in the combo box and then click "delete" button to delete unused record.

iii. Administrator also can send an announcement to another lecturer. See figure 8.9

Figure 8.9; Announcement sub-module

vii. Long leave sub-module

i. Choose long leave sub-module and administrator will directed to the sub-module (figure 8.10).

ii. Administrator could view the status long leave of lecturer and also when they click the ID lecturer one page will pop-up to describes their personal detail see figure 8.10

iii.

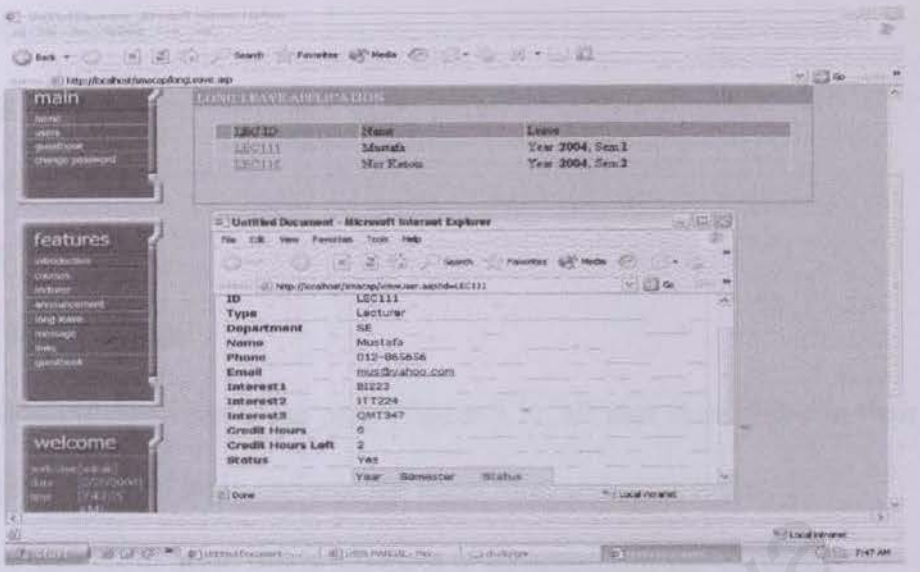

Figure 8.10; long leave sub-module

iv. Deputy Dean of Academic and Head of Department Categories

DDA and HD have a same sub-module in this system, but there are some different in assign the courses to lecturer. For DDA, there are two parts like University courses and Faculty compulsory core courses that DDA will assign all the courses in this part to the lecturer. Beside that for HD there are three pat such as elective courses, Faculty Department courses and Faculty core courses. There are 9 sub-modules which are;

- Home
- Change password
- Introduction
- Course
- Lecturer

- Announcement
- Long Leave
- Massage
- Link

1. Login sub-module

i. From the smacap home page (figure 8.1), all user should key in their password and login and into the login form and press login.

ii. A successful login will bring them to administrator sub-module..

iii. This section have three function can be found in this sub-module which are;

- Add new record
- Delete existing
- View an email

2. Change password sub-module

Choose change password sub-module and DDA and HD will directed to the sub-module (figure 8.5).

3. Course sub-module

i. Choose course sub-module and DDA and HD will directed to the sub-module (figure 8.11).

ii. Click university courses , there are many courses that include in this part for example GXEX 1406 and when admin click that courses another page will pop-up (figure 8.12)

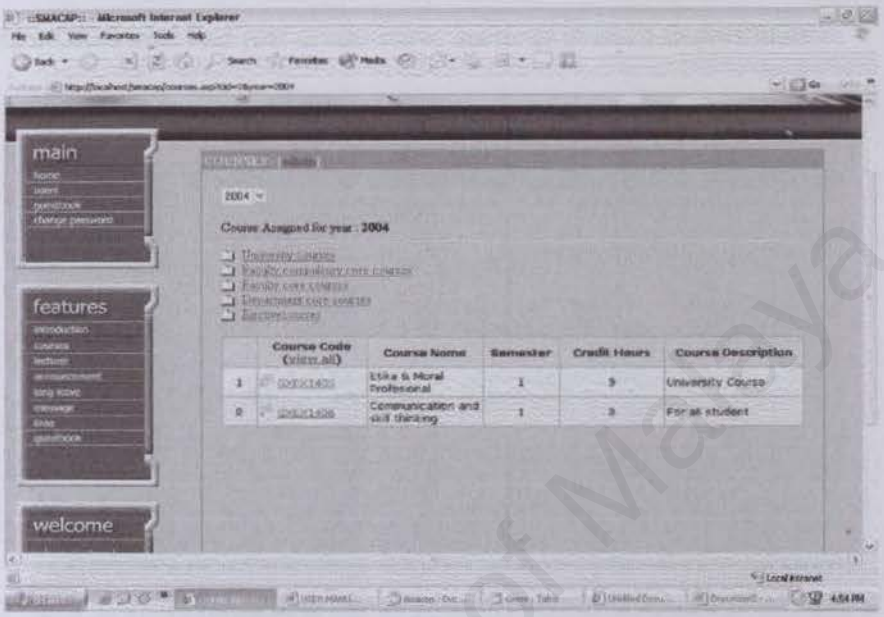

Figure 8.11; course sub-module

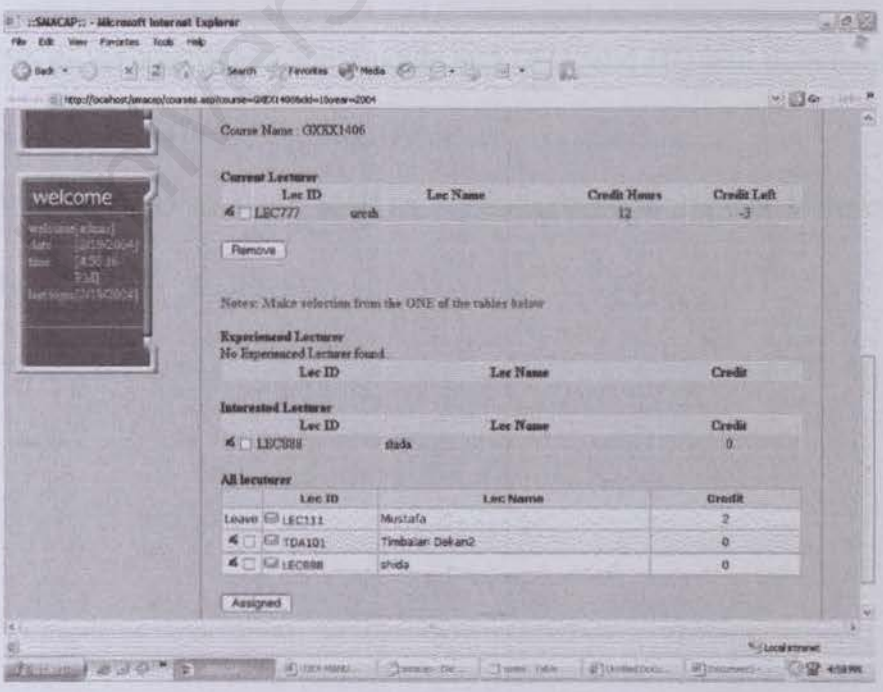

Figure 8.12; after click one course

4. Lecturer sub-module

i. Choose lecturer sub-module and DDA and HD will directed to the sub-module (figure 8.13).

ii. Here DDA and had just could view lecturer in each department

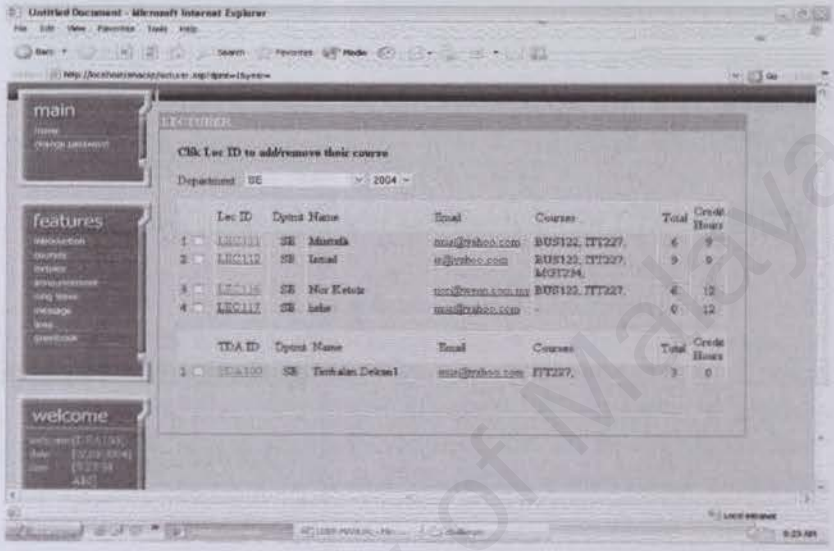

figure 8.13; lecturer sub-module(for DDA and HD)

5. Announcement sub-module

i. Choose announcement sub-module and DDA and HD will directed to the sub-module (figure 8.14).

ii. DDA and HD also can send an announcement to another lecturer. See figure 8.14

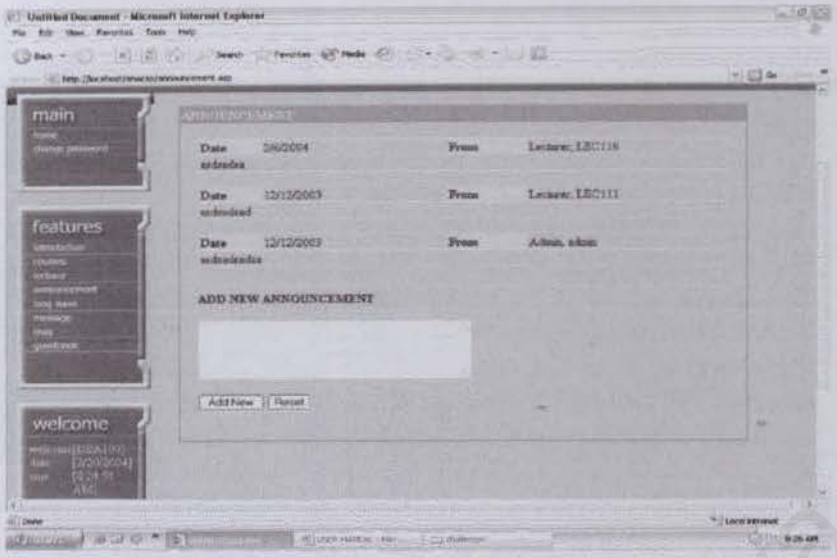

figure 8.14; announcement sub-module (for DDA and HD)

6. Long leave sub-module

i. It is same to administrator

v. Lecturer categories

There are three sub-module that important in these categories like course sub-module, Lecturer sub-module and also long leave sub-module. Other sub-module , lecturer could view and input data for message sub-module;

1. Courses sub-module

i. Choose course sub-module and lecturers will directed to the sub-module figure 8.15

ii. They could view what courses that has been assigned.

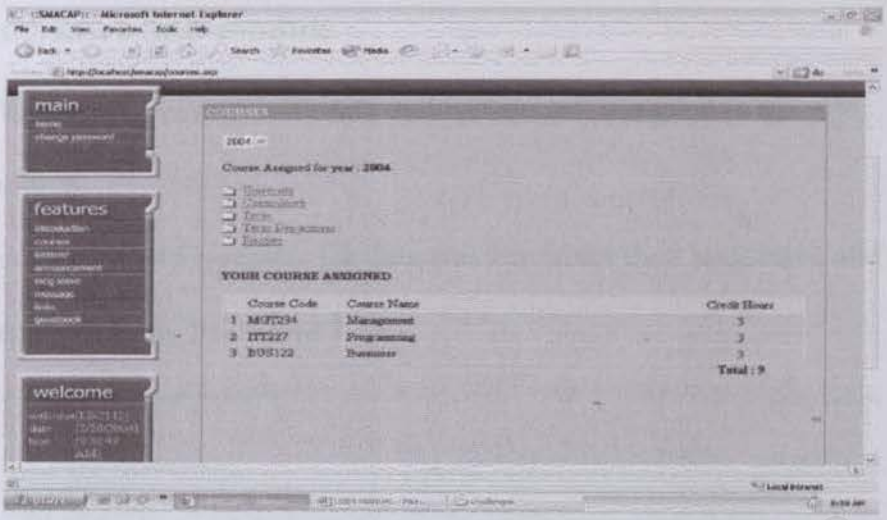

Figure 8.15; course sub-module (for lecturer)

2. Lecturer sub-module

i. Choose lecturer sub-module and lecturer will directed to the sub-module see figure 8.16

ii. Lecturer should input data in personal detail and also choice three courses that interested.

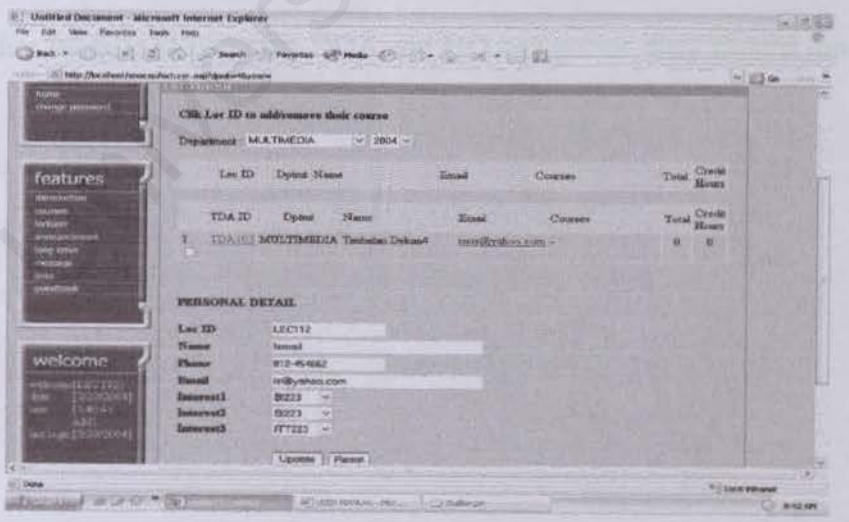

figure 8.16; lecturer sub-module (for lecturer)

3. Long leave Sub-module

i. Choose long leave sub-module and lecturer will directed to the sub-module.

ii. Lecturer should complete the date and reason for their long leave and click "apply" button. See figure 8.17

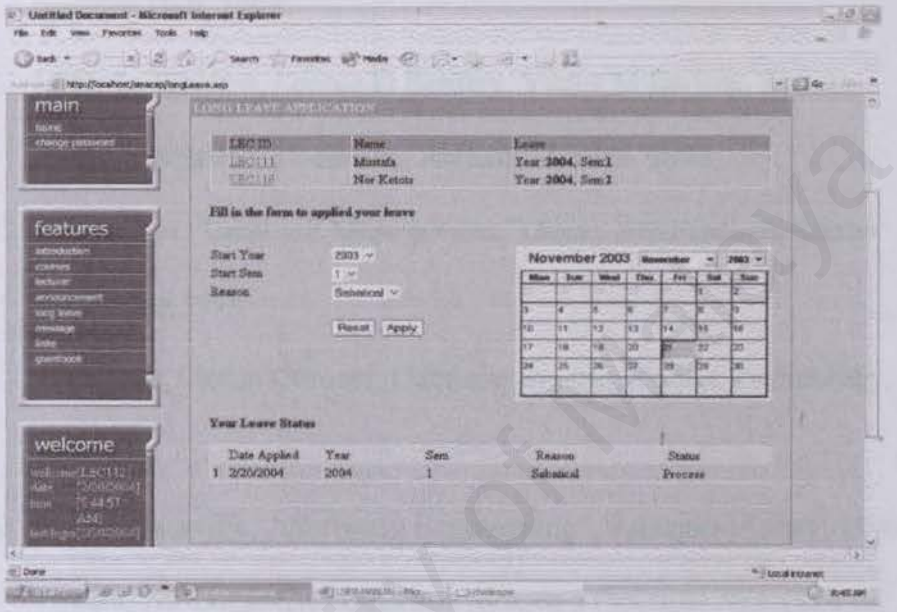

Figure 8.17; long leave sub-module (for lecturer)

The other module same to the DDA and HD categories, they should input data that require.

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